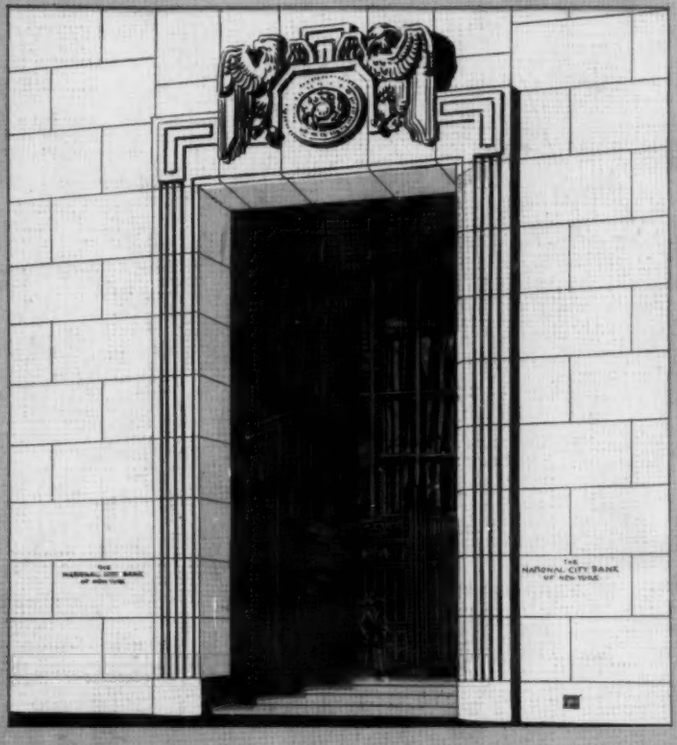
# THE ARCHITECTURAL FORUM

IN TWO PARTS



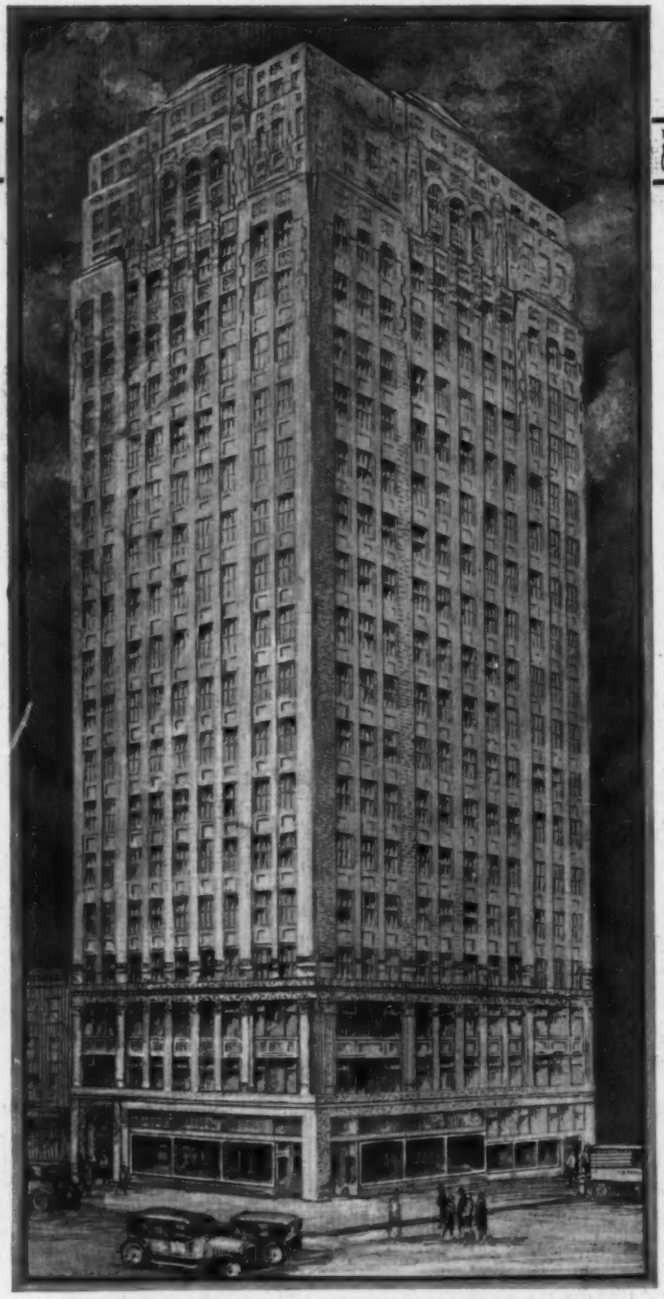

## PART ONE
## ARCHITECTURAL DESIGN

JUNE

1928

BANKS REFERENCE NUMBER

PRICE $3



*Green Central Building, 4th Avenue and 29th Street, New York City, with all shop fronts of Brasco Series 500 All-metal construction. Architects, Shampan and Shampan; store fronts furnished by the Aetna Steel Products Co.*

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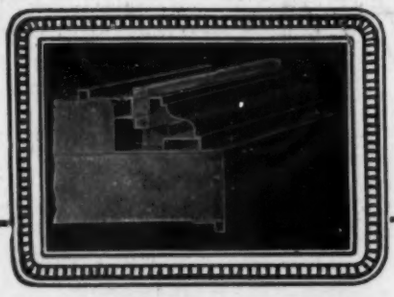


*Note the distinctive grip on the glass and the indirect screw pressure method of holding it, in this illustration of Brasco Series 500 All-metal construction. Brasco is unequalled for safety.*

PROPOSED DESIGN FOR THE
CENTRAL UNION TRUST CO. BUILDING, NEW YORK

OFFICE OF JOHN RUSSELL POPE, ARCHITECT

From a Rendering by Otto R. Eggers

THE
ARCHITECTURAL
FORUM

VOLUME XLVIII NUMBER SIX

JUNE 1928

# THE PROBLEM OF BUILDING A BANK

BY
PHILIP SAWYER
OF THE FIRM OF YORK & SAWYER, ARCHITECTS

IN 1905 and in 1921 and again in 1923 I attempted to write an article on this subject of banks. During the interval between the first and last of these articles there was, of course, something new to say, as bank architecture in this country had undergone great changes and developments. In the last five years, the problem has remained much the same except that our building units are gradually becoming larger and a bank is more likely than heretofore to occupy a comparatively small proportionate area of the whole structure. An article written now, therefore, from the same point of view,—that is the architect's,—would tend to be a *resume* of the same material. It occurs to me, therefore, that perhaps it might be as well to treat the whole subject from the client's viewpoint. A few years ago there was a story that one man at a club remarked to another: "I don't understand this business of using the earth as a return for radio stations and dispensing with *antennæ*." To which the other replied: "Why it's perfectly simple. Instead of not stringing the wires that they don't need overhead, they don't lay the conduit that they don't have to have underground." The former articles were written for the architects who, of course, never read them. This is written for the clients who are still less likely to develop the slightest interest in the subject, and who seldom see an architectural magazine unless they are loaned a copy by an architect whose work is illustrated therein. The question of who doesn't read the article is therefore academic, but it is understood that pictures must be garnished by a certain amount of letterpress to form a background or a surround for the illustrations, though the illustrations are of paramount importance.

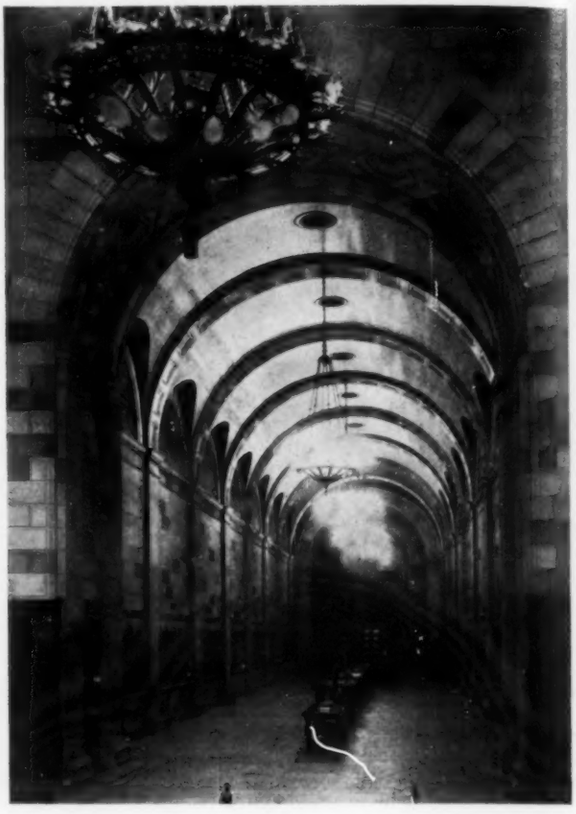
Nowadays an architect is frequently selected not by the banker but by the builder or promoter, or in fact by anyone else who has the idea of relieving the pressure on a certain crowded bank and at the same time cashing in on a valuable site. There are still, however, sporadic instances where a bank itself actually determines to build and goes about the selection of an architect with care and system. Recently such an institution sent one of its officers with its own architect, who takes general care of all its building operations from Paris and London to Bogotá and Vancouver, on a trip through the United States, to look at all the bank buildings which appealed to them and particularly to ascertain from the organizations themselves how accurately the architects had been able to provide for their activities, effect economies in their administration, running expenses and overhead, and particularly to foresee and provide for their development and growth. They went to Boston, to New York, as far south as New Orleans, and as far west as Chicago and Louisville. They returned with a definite recommendation of the firm which seemed to them to have produced the most practical buildings and to have left behind most uniformly satisfied clients. This firm they recommended as "the least worst." Let us suppose that the architect is selected in some such intelligent and thoughtful way and not merely because he has built some prominent buildings which may or may not work, or because he has married our favorite aunt or possibly because he belongs to the same golf club!

The next question is, what does the architect do with the project? A client visiting an office here recently was amazed to find some 30 experienced men, each engaged upon a uniform-sized sheet, 2 feet by 4, and to be told that there would be 104 such sheets in the contract set, each of which would take, merely for the final drafting, after everything in the design and construction had been thoroughly established, about three weeks' time to make. He was also shown the folders of preliminary drawings, innumerable studies and sketches on tracing paper, which preceded this final stage. But it was of course impossible to convey to him any conception of the effort and expense which had gone to produce the final design. Let us begin at the beginning. The architect has, in preparing his contract with the bank, given his client the choice of paying the architect's percentage and of paying separately the fees of the engineers for (1) foundations; (2) heating and ventilating; (3) electrical work,—or of paying the architect an increased percentage covering these items and requiring the architect to employ and pay the engineers himself. In any case, the client has probably seen the wisdom of hiring an equipment engineer to make the preliminary studies of his organization, and of typical working layouts for all his departments, and to design, detail, specify and contract for all special equipment, besides planning the equipment behind the counter screen, including every item of working furniture down to receptacles for ledgers, the style of buses and details of files and cash drawers. The bank has thus relieved itself of the undertaking.

In either case the client will save a proportion and

*Photos, Richard Southall Grant*

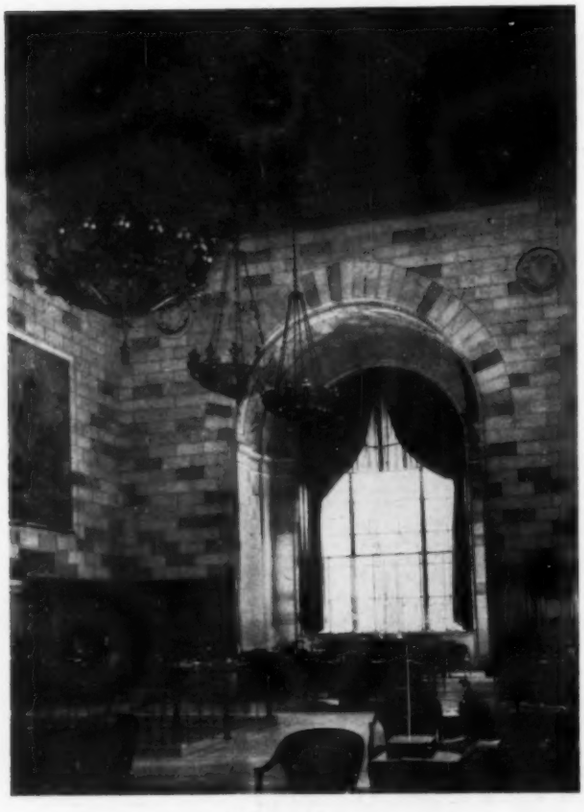
General View



Public Lobby

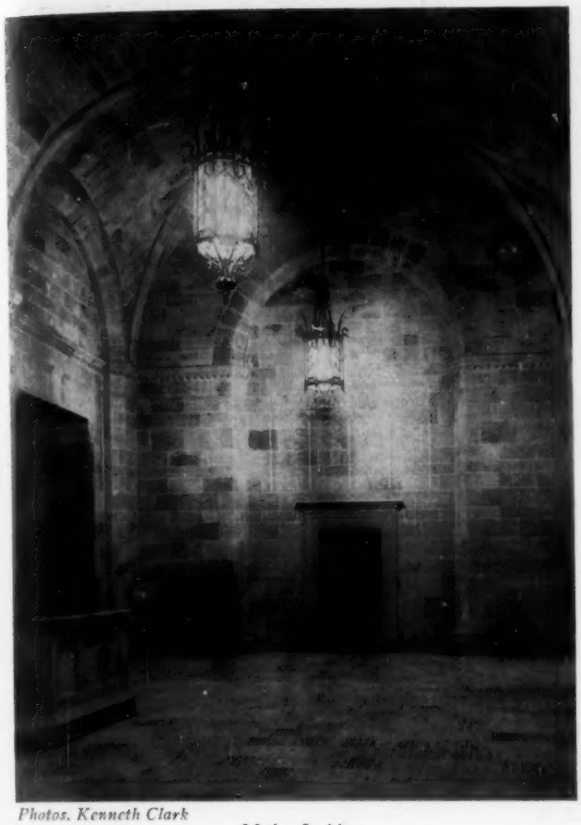
First National Bank, Boston

York & Sawyer, Architects



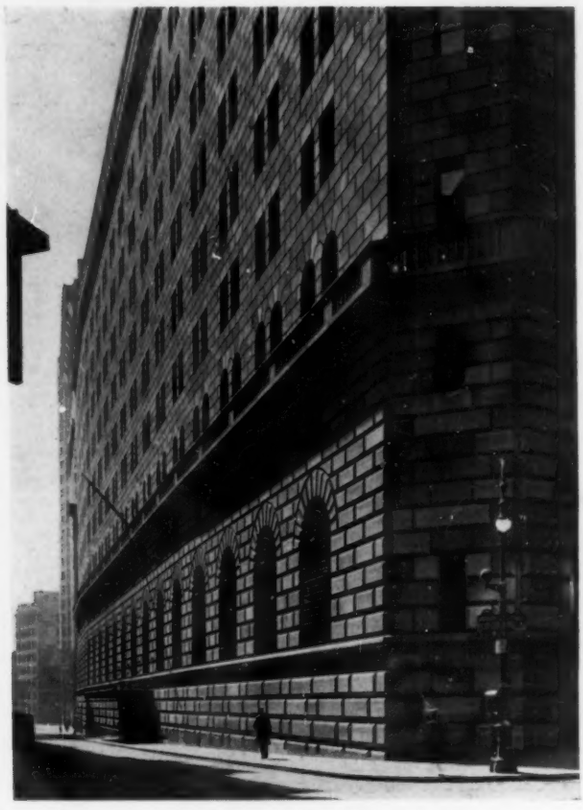
Officers' Space

probably the whole of the fees paid, since he will get bids on uniform drawings and specifications, obtain real competition, and receive comparable figures instead of being obliged to make comparison among a dozen offerings of heterogeneous material, each of a different manufacturer's design, the actual relative value of which it is impossible for him to determine. In either case the architect now recommends to the client the various engineers to be employed, and they are decided upon at once. It may be that the foundations present no difficulty, in which case they are handled by the architect's office. Possibly it is a simple project, and the architect designs the heating and ventilation and electric work. But in an undertaking of importance it is real economy to employ the engineers mentioned, since no architect can afford to have continuously in his employ, or to give such complete, all-round experience to these men as they are able to acquire practicing independently and covering exclusively their own subjects. The architect begins, therefore, by making, with the equipment engineer, a thorough survey of the existing organization of the bank; he studies diagrammatically, without regard to limitations of site, cost, or construction, the problem presented by the housing of the bank's organization; and he endeavors to foresee and to provide for its anticipated growth. This last is, of course, the most difficult item of all, and it is here that the wise architect shows an optimism which the banker, always apparently pessimistic, regards as



*Photos, Kenneth Clark*

Main Lobby



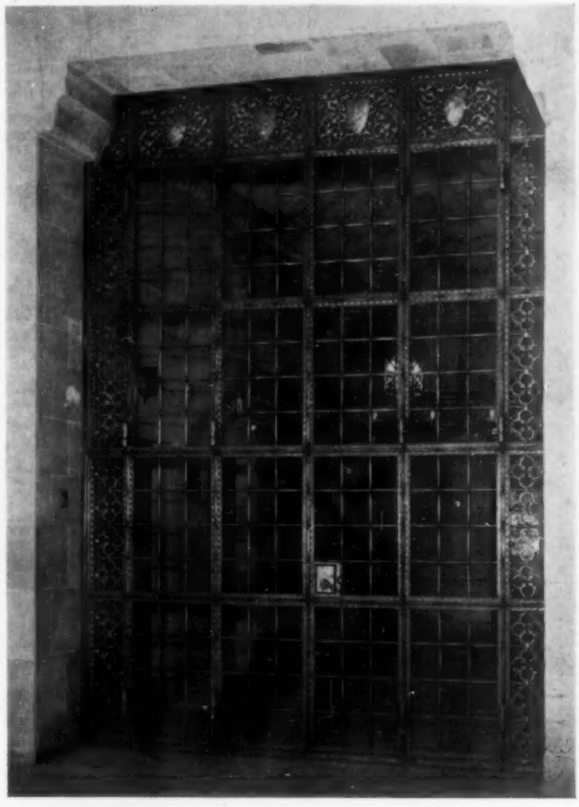
Maiden Lane Facade

Federal Reserve Bank, New York

York & Sawyer, Architects

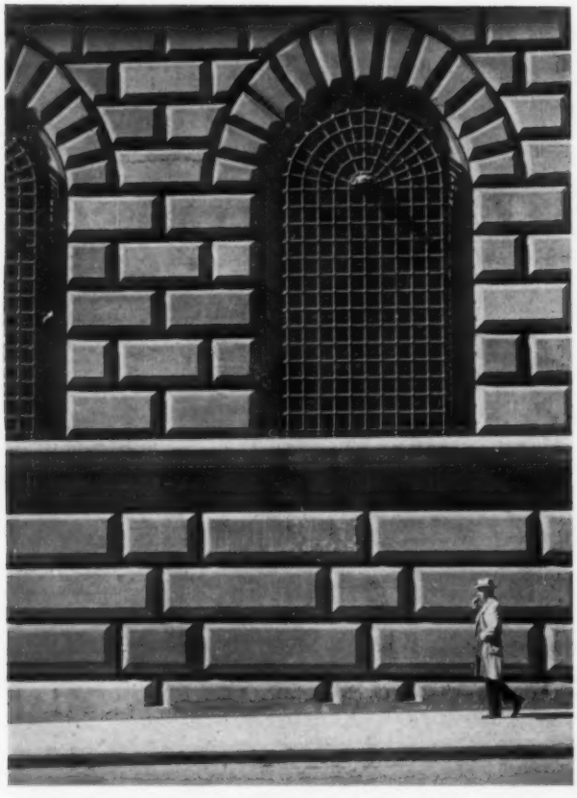
extravagant, but in which, nevertheless, the architect generally proves to be right. In the past 30 years an allowance for growth of as much as 250 per cent has sometimes been provided, the assumption on the part of the bank being that it was taking care of the next 20 years' growth. None of these institutions has failed to expand beyond its anticipated bounds in less than ten years For it is, of course, the active bank which builds, just as it is the active bank that grows.

The problem of providing for future growth is a stumper. We used to be told that national banks grew at the rate of 6 per cent a year, which means that a bank should double its resources in, say, 12 years. In 15 years from 1910 to 1925 national bank resources increased 146 per cent, an actual rate of growth of 6.2 per cent a year, or, flat, of 9.7 per cent a year, doubling in 10 or 11 years. Resources of trust companies during the same period increased 174 per cent, and those of savings banks 123 per cent. During the previous 15 years, from the depression of 1895 on, including the drop in 1898, the average rate of increase for all banks was 7.5 per cent. In a chart showing such growth, there is a dip between 1875 and '80, the rise is fairly constant until the acceleration between 1915 and '20, and then a decided drop, followed by the present recovery. The rate now is about the same as before the war. These figures are given to emphasize the fact that when a banker says largely, and it is the natural thing: "We'll provide for double our present

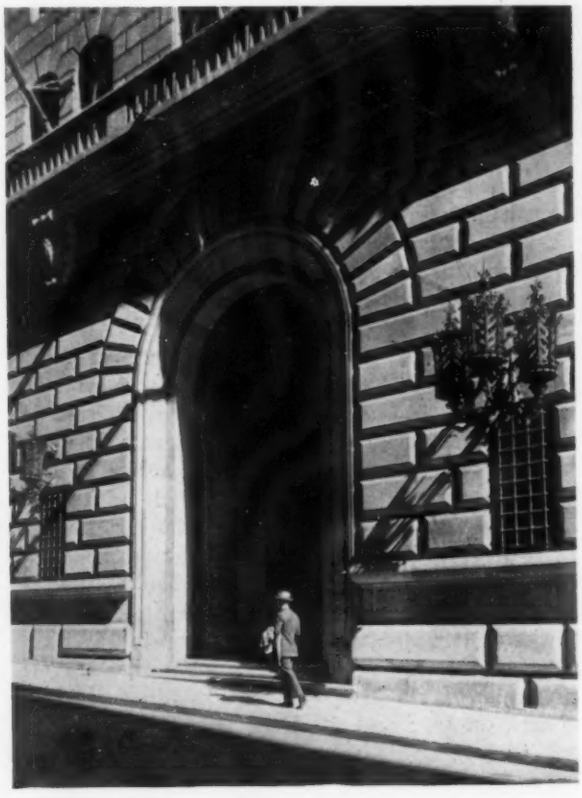


Screen in Entrance Lobby

PUBLIC SPACE



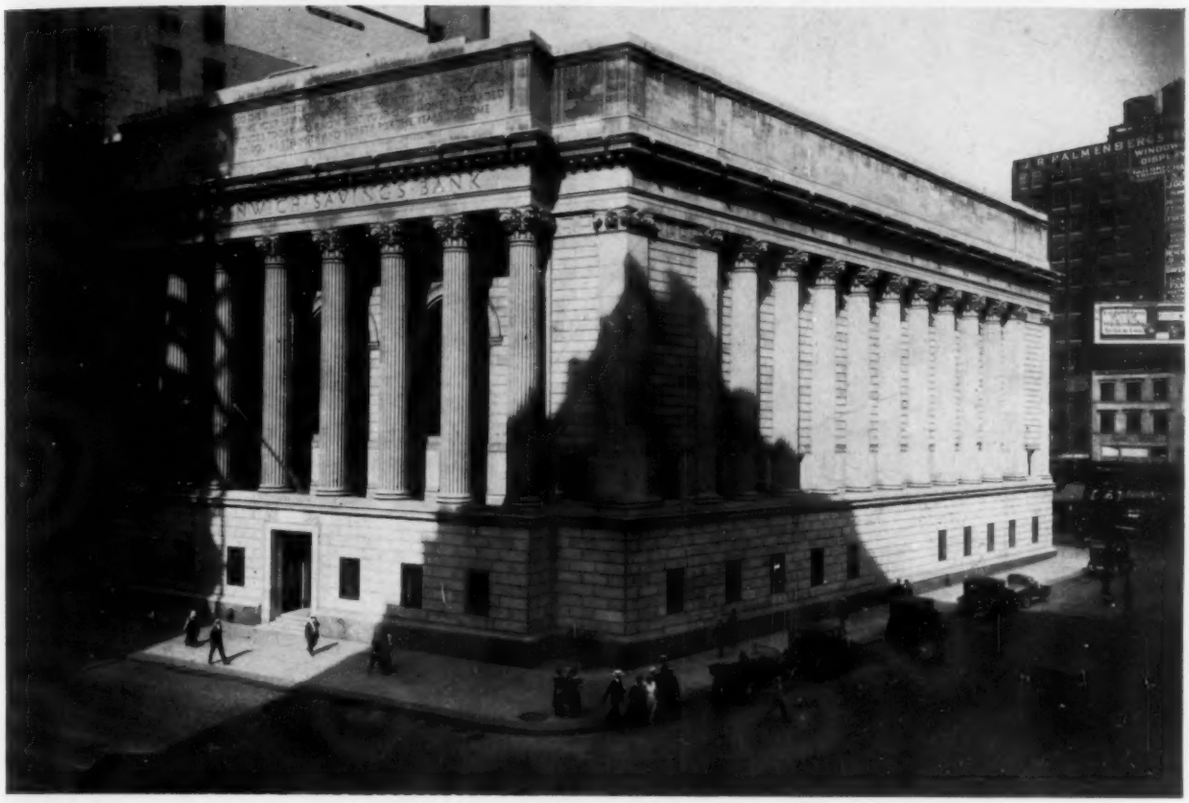
WINDOW DETAIL



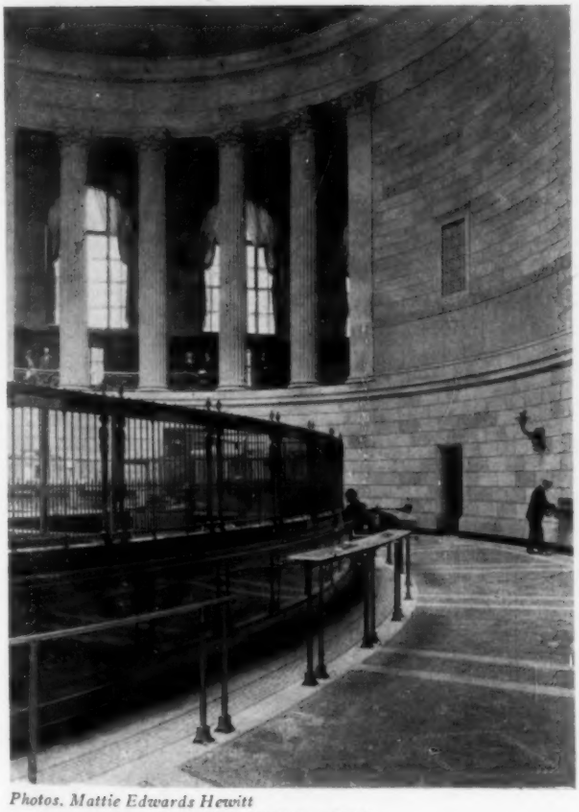
ENTRANCE DETAIL

FEDERAL RESERVE BANK, NEW YORK

YORK & SAWYER, ARCHITECTS



GENERAL VIEW



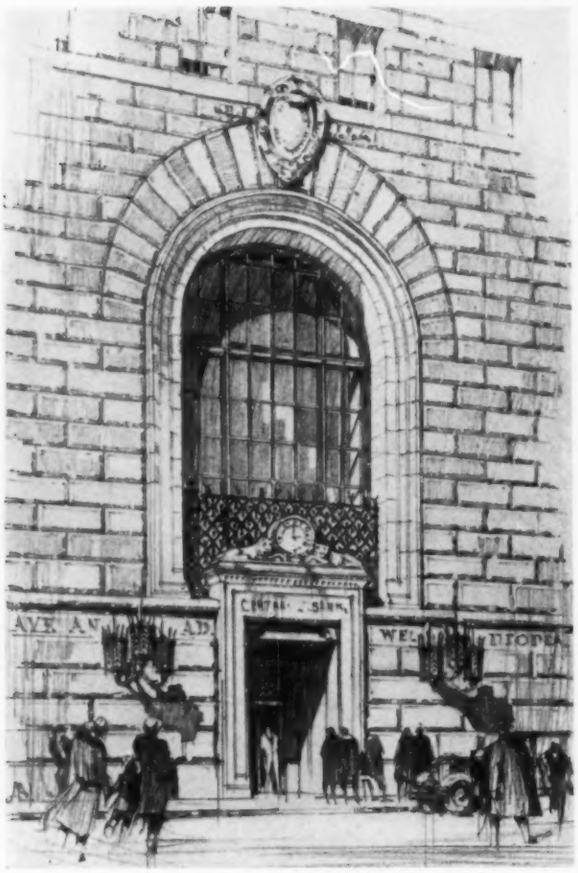
BANKING ROOM

ENTRANCE DETAIL

*Photos. Mattie Edwards Hewitt*

THE GREENWICH SAVINGS BANK, NEW YORK

YORK & SAWYER, ARCHITECTS



Entrance Detail

Banking Room

Central Savings Bank, New York
York & Sawyer, Architects

capacity;—we don't want to make another shift for 25 years," he is not being so gorgeously liberal as he imagines, because he is probably not providing for quite half that period. Nor is he anticipating a possible merger or consolidation which may tax his building to its utmost, and which, alas, often occurs just too late to make proper plans for expansion!

Rent is, after all, a very small proportion of the total expense of a bank, and simplifications effected in operation and administration by a compact and logical working plan may often reflect economies which make any differences in rent negligible. Having made a thorough study of the organization of the bank, the space requirements of its units, its personnel, and the inter-relation of its departments, and having adopted an assumption of the growth to be provided for, actual counts are made, over a sufficient period of time to establish an average, of the number of public contacts made by each division and to determine the frequency, importance and character of their inter-communications. This material is digested, reams of small scale sketches are prepared in the attempt to fix upon paper all this data, first without regard to physical limitations and later to meet the specific requirements of the lot, the volume of the building under the zoning law,—if there is one,—and the limitations of construction and of cost. When a workable scheme, represented in diagrammatic plans, sketches and block elevations, proves itself feasible, an accurate financial statement is prepared showing, (1) the total investment, including rent, building fees and not omitting taxes and carrying charges during the period of construction; (2) annual expenses, including all interest charges, amortization, taxes and ground rent, if any; (3), annual income from any portion of the building rented to tenants, and as a result, the amount which remains to be charged against the bank as rent. If several schemes are under consideration, such statements as I have outlined are prepared for each one, together with a careful mathematical analysis of the proportion of "light" rentable area,—that is area not more than 25 feet deep and directly opposite an outside lighted wall, all other floor space being assumed to be "dark,"—in proportion to the total cube of the building, enabling a wise decision to be made upon actual facts instead of on vague assumptions. In the most economical types of office buildings, competently planned, there should be not more than 16 cubic feet to be paid for by the owner originally in order to obtain one square foot of "light rentable area." Of course this will not apply to that portion of the building occupied by a banking room say 50 feet in height, and in a monumental building

General View

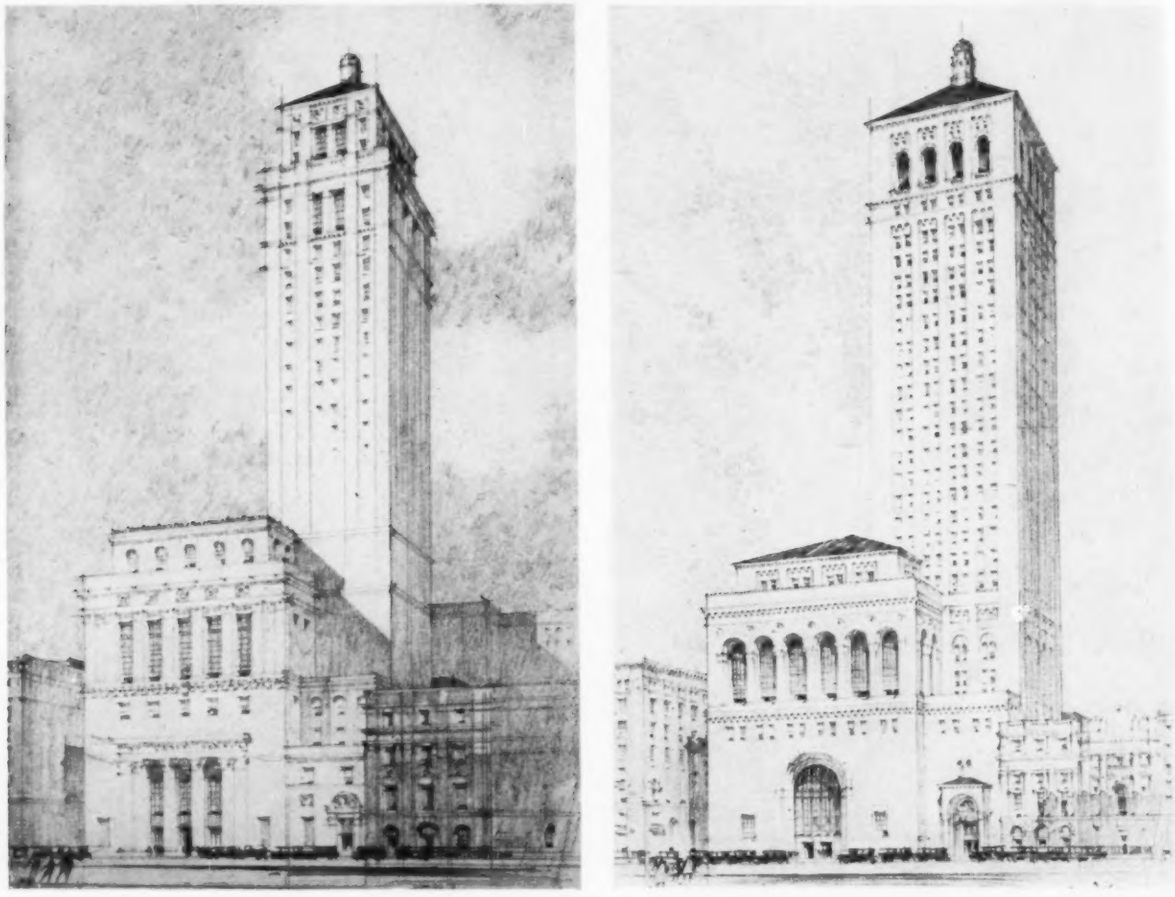
Washington Trust Co., Westerly, R. I.
York & Sawyer, Architects

Entrance Lobby

The Royal Bank of Canada, Montreal
York & Sawyer, Architects

it may be necessary to increase this proportion to some slight extent even on the typical office floors. But the proportion of 1:16 should be adhered to as closely as possible, since if, for example, it should work out 1:20 it is obvious that this building is operating under a 20 per cent handicap in competition with an ideally efficient neighbor and must therefore have sufficient advantage in location, character or prestige to charge 20 per cent more rent or, at the same rent, to suffer a corresponding diminution in its return on the investment, and this has to be considered.

Much depends during this preliminary work upon the coöperation of the client. The bigger and busier the man at the head of the bank, the more likely he is to appreciate the importance of this fundamental work and either to give it his personal attention or to depute for that purpose competent representatives. The closer the connection between the bank and its architect during this period, the quicker the matter will proceed and the more satisfactory the final results. Where weekly meetings are held at the architect's office and the whole work reviewed constantly, it is impossible to go far wrong and, with the least lost motion a scheme is reported to the building committee with all the data necessary to enable it to arrive at a wise decision. Upon the approval of these preliminary drawings by the bank, the architect proceeds to study at small scale with the structural and mechanical engineers the steel, heating and ventilating, plumbing and lighting. It is at this point that he determines the type of floor construction to be used; locates his vent shafts and pipe chases, and works out the elevators, which present nowadays a complicated problem in any city where zoning laws are in force. Not long ago one could take the area of a uniform floor and, assuming a density of occupancy, tell at once the number of elevators to be provided. Now, where each setback proportionately reduces the area, where buildings are of great height and are served by a number of "banks" of cars stopping at different levels, it is not so simple. But the net result must be that a man entering the building and just missing an elevator shall not wait for the next car longer than a certain interval, which in New York is usually assumed to be 25 seconds. The considerations just mentioned may modify to a certain extent the original drawings, but if the conditions have been properly foreseen, these differences will be unimportant. The bank now authorizes working drawings. These are prepared at a larger scale, on cloth, and are accompanied by all the details, at still larger scale, which it is desirable to have in the

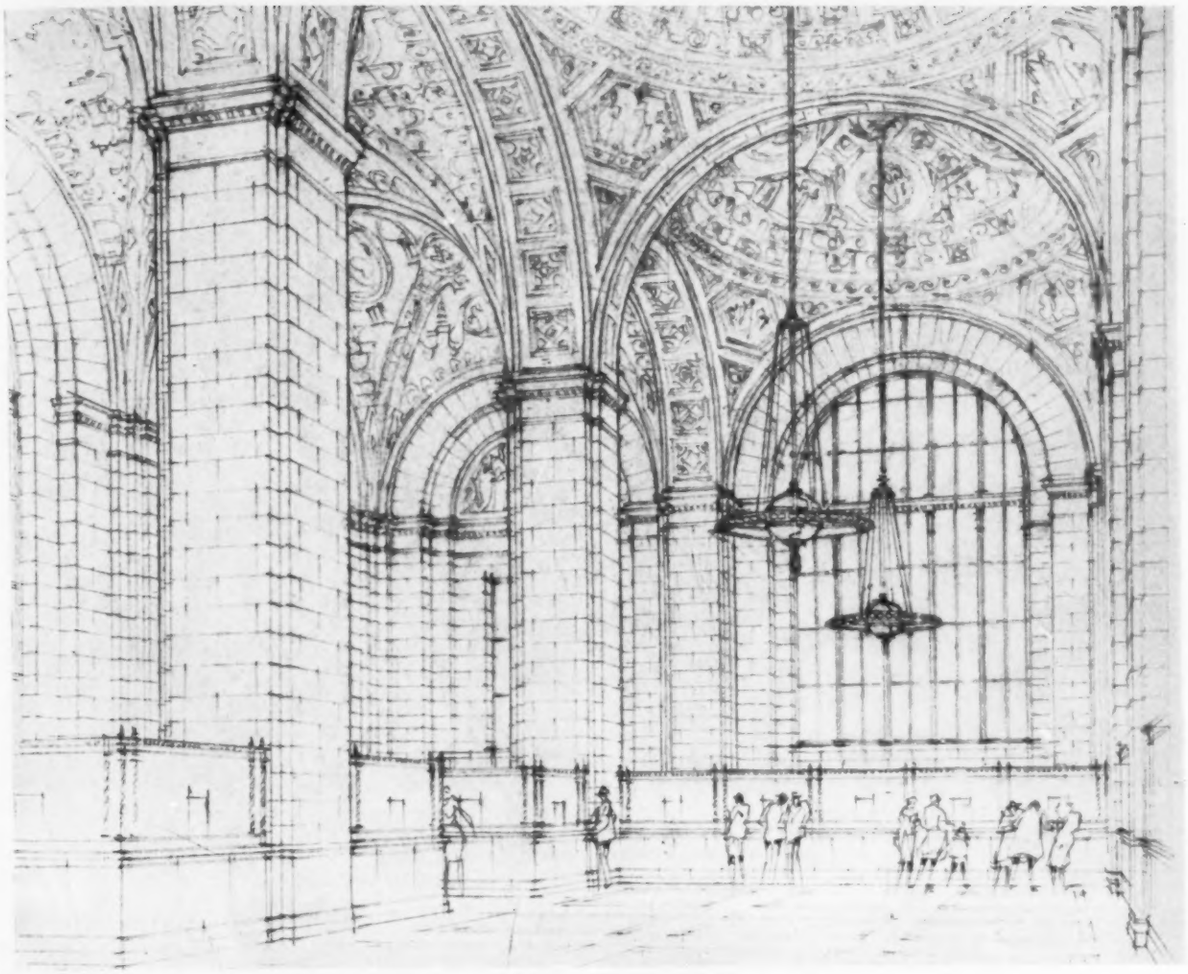


Preliminary Studies, Canadian Bank of Commerce, Toronto
Darling & Pearson, Architects; York & Sawyer, Consulting Architects

hands of the contractors in order to obtain the closest estimates. At the same time specifications are outlined by the architect himself as regards fundamental uses of materials, and as the working drawings and specifications are developed, the same weekly meetings of the bank representatives and architect determine in detail all questions which may come up regarding the extent to which mechanical ventilation shall be used, for example; the character of the vault work; the materials to be employed and the finish of the various parts of the structure.

There are, in general, two ways of engaging a contractor. Nowadays the bank frequently chooses a firm in which it has confidence and agrees to pay it the actual cost of the work, plus either a percentage fee or a fixed sum which will cover its own office costs and profit. It is often argued that this method precludes competition. In reality it means that the general contractor is paid his actual cost on that portion of the work which he performs himself (usually the masonry), but that the excavation, foundations, steel, elevators, and in fact contracts of all other trades are let in competition upon bids obtained by the general contractor and submitted to the building committee and to the architect. This arrangement has the great advantage that the builder is acting professionally as the adviser of the owner, that his interests are identical with the bank's, and particularly that he may be appointed at the inception of the project and called upon for advice and for preliminary estimates during its early stages. The second method is to wait some months until the architect has had time to complete working drawings and specifications, and then to obtain competitive bids from a number of general contractors, selecting the one whose bid seems most desirable in consideration of his ability and reputation. In this case such bids are opened at a meeting of the building committee, the general figures, as well as any alternates, being listed on bid sheets prepared by the architects, consideration also being given to the character of the sub-contractors listed by the firms bidding as those whom they propose to use.

A number of men are assigned to the checking of contractors' drawings. One of the first details is to check each piece of steel that goes into the supporting frame. At the same time the stone contractor's details for each block of stone in the exterior wall are checked, as are also the windows, spandrels, and any other work to be built into the masonry during construction. The care taken in the architect's office to lay this stonework so that estimates upon it



Preliminary Study, Canadian Bank of Commerce, Toronto
Darling & Pearson, Architects; York & Sawyer, Consulting Architects

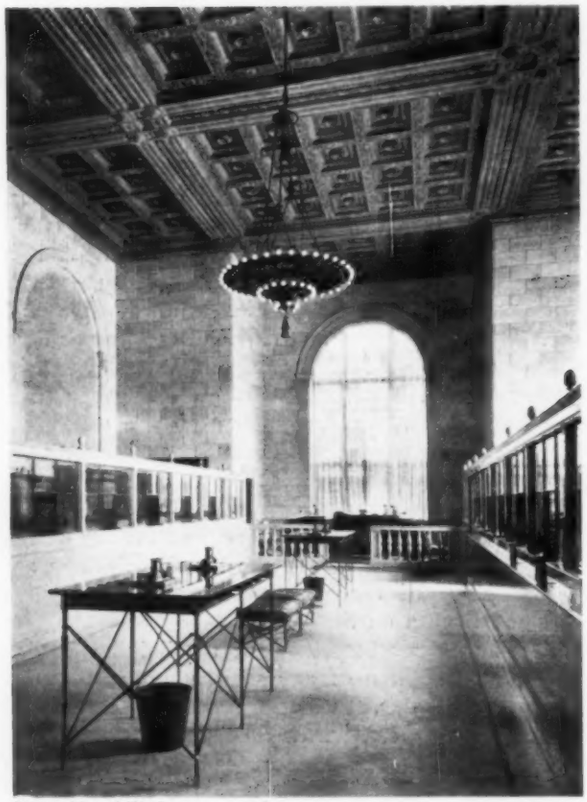
may be accurate, errors avoided, and each block come to the building ready for its appointed place, would probably seem to the client excessive. Each block of stone, which has already been indicated many times in preliminary drawings, is shown in the contract drawings, in plan, elevation, and section. It is again shown in its three dimensions on the ¾-inch scale drawings. If it has any mouldings on it, these are drawn full size. If these mouldings are important or if they are ornamented, there is a full-sized model of them. The stone contractor also draws each stone in plan, elevation and section on his setting plans, and usually there is an isometric perspective on a card which goes to the cutter. Each stone has therefore been drawn from a dozen to 20 times, and checked between the architect's drawings and the setting plans before it arrives at the building. There should be very little cutting on the site unless some slight error has occurred between the checking of the steel and stone. During this initial period of construction, plaster models have been prepared, sometimes, first, at small scale and later usually at full size for all ornamental work. This includes carved stone, exterior ornamental iron, interior plaster, the bronze work of doors, cages, check desks, screens,—in short for all elements in building which are sufficiently important and where it is impossible to determine them satisfactorily on paper. If it is possible to have all these models made by a single firm, the best results should be obtained. The moment that the construction is out of the way and the details of the shell of the building established, the banking room, board room and all spaces requiring special treatment, are drawn out at larger scale, full-sized details are made, and the scheme of decoration, furniture, rugs and lighting fixtures determined, the architect in many cases preparing detailed drawings for important furniture, and cartoons for the design of the rugs. Sketches for the lighting fixtures are carried forward far enough to enable competitive bids to be taken on them.

The architect's inspection of the building begins with the demolition of any structures on the property, follows through the excavation, foundation work, and the construction of the steel and the masonry. No matter how careful and accurate the drawings and specifications may be, questions are bound to come up which he has to settle "in the

Entrance Detail

General View

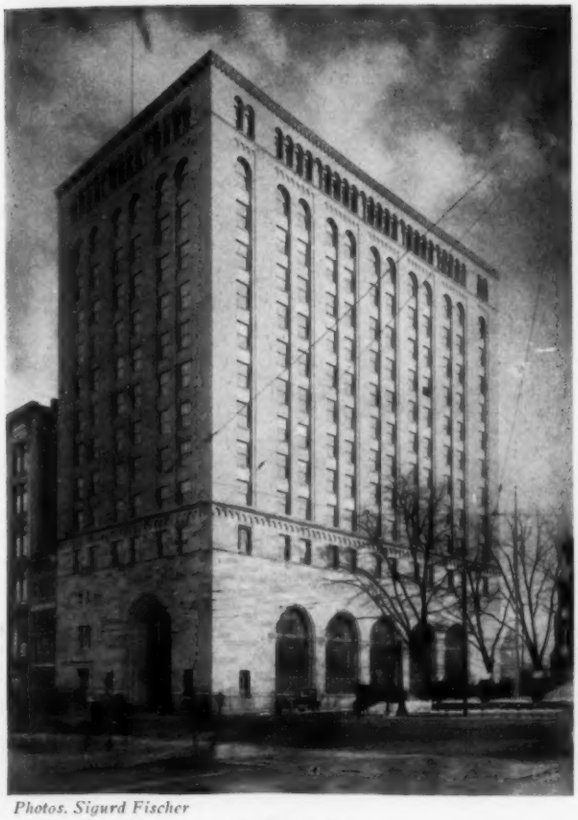
First National Bank of Boston, Buenos Aires
Chambers & Thomas, Architects; York & Sawyer, Consulting Architects



*Photo, Sigurd Fischer*

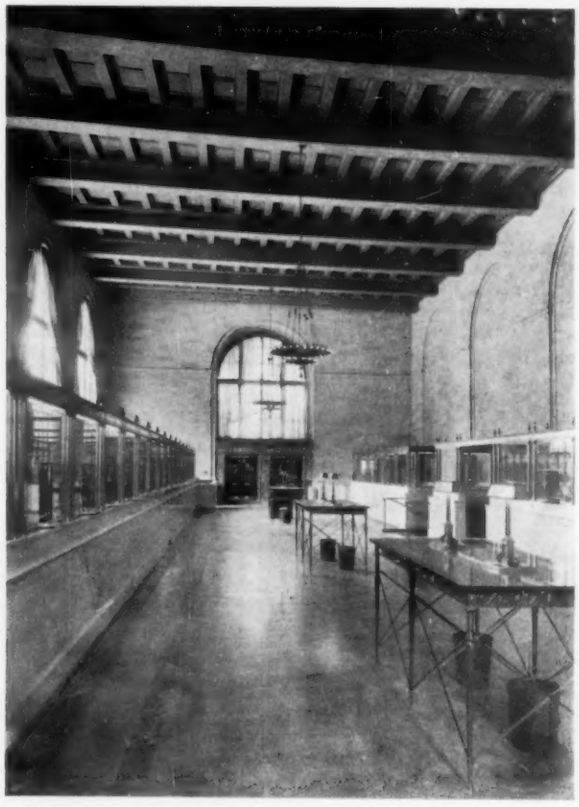
Washington Trust Co., Westerly, R. I.
York & Sawyer, Architects

field." Although all the work of the mechanical trades, pipe chases, ventilating ducts, and plumbing pipes, have been checked with the architectural drawings, minor adjustments are likely to prove necessary. The architect now begins his visits to the quarry where he selects the stone; the sheds where it is cut and carved; the foundries where the bronze is cast; the shops where wrought iron is prepared and where the vault work, furniture and equipment are being built. In the case of one bank, the builder in going over the quarries in Indiana was enabled to select the "grout," the refuse, good stone being discarded because of varieties in color outside of the old fashioned classification,—and by accepting any sound stone without regard to texture, color, or any imperfection not impairing its soundness, it was possible to obtain for a charge little more than the freight a quantity of stone already quarried which made not only the cheapest but one of the most effective stone walls imaginable. Since that visit the 35 per cent of "discards" has vanished; there is no waste in Indiana, and the material formerly discarded has become "our antique Gothic" and commands a higher price than perfect stone. "Fine," said one old Scotch quarryman to his partner; "this is the archytect we've been lookin' for for 20 years. I'd like to kiss him." And returning from this visit, the working drawings for the bank's walls, nearly 1000 feet in length, were redrawn, some 70,000 cubic feet of stone eliminated, and over



*Photos. Sigurd Fischer*

Exterior View



Banking Room

First Bank and Trust Co., Utica
York & Sawyer, Architects

$300,000 saved to the bank,—at an additional drafting expense to the architect, it is fair to add, of some thousands of dollars.

Following the financial statement already spoken of, the architect will have prepared, with the contractor, a detailed budget of the general contractor's work, and that of the hundred or more sub-contractors who are nowadays required to make a completed building. He will have added to these items the allowance made for miscellaneous material such as equipment, furniture, rugs and hangings, and in a complete statement he will include the last items down to waste baskets, blotting pads, match holders, paper cutters and calendars. These may all be specially designed, if required, and decorated with the seal or insignia of the bank. It is impossible to indicate every detail of the work necessary on the part of the architect to produce a satisfactory result. For instance, suppose there is over a window a keystone surmounted by a head such as those in the University Club of New York or The Royal Bank of Canada. This will have been drawn a number of times in the preliminary drawings until its proper weight and scale have been satisfactorily determined. It will then be incorporated in the small scale elevations, studied at three-quarter scale, which is three times that size, and then full-sized drawings will be made, rendered in soft pencil or charcoal. From these drawings the stone in the cutting shed will be "boasted,"—that is, roughly cut to allow sufficient


Dime Savings Bank, Waterbury, Conn.
York & Sawyer, Architects

volume,—and a model will be made at full size for the carver. A particularly competent carver will be selected from among men working on the building, and the architect will follow closely the actual work. Endless care is necessary from start to finish if the result is to be acceptable. Take such an item as the board room. It has been studied at small scale and shown on the contract drawings. Larger details are then made at three times this size, and color studies are prepared in collaboration with the decorator. Full-sized details are drawn of every moulding in the woodwork, of the floor, if it involves marble borders or mosaic, and of the ceiling if it is ornamented. Shop drawings for this woodwork and for the stone or marble floor are checked. Rugs are cartooned, "tufts" selected for color, and samples are manufactured. Curtain stuff is decided upon, and the hangings are designed. Lighting fixtures are drawn or selected, and samples are approved for the finish of the woodwork. The ceiling tones and all the elements of the color scheme are assembled for final determination at the building. This wearisome list is a fragmentary indication of the care and drudgery necessary to turn out acceptable work. In doing it the wise architect will disregard his own costs, since his success depends not upon the percentage of profit upon any single structure, but upon producing continuously a series of buildings each of which will demonstrate annually the convenience of its arrangement, economy of its upkeep and, last, its artistic merit which may appeal to the bank's clients.

Henry Wotton, Knight, writing in 1624, follows his dedication to Charles, Prince of Wales, with this opening: "In architecture as in all other Operative Arts, the end must direct the Operation. The end is to build well. Well building hath three Conditions: Commoditie, Firmenes and Delight!" And Isaac Ware, Esquire, of His Majesty's Board of Works, 1756, says in his preface: ". . . nor shall we fear to say that the art of building cannot be more grand than it is useful; nor its dignity a greater praise than its convenience."

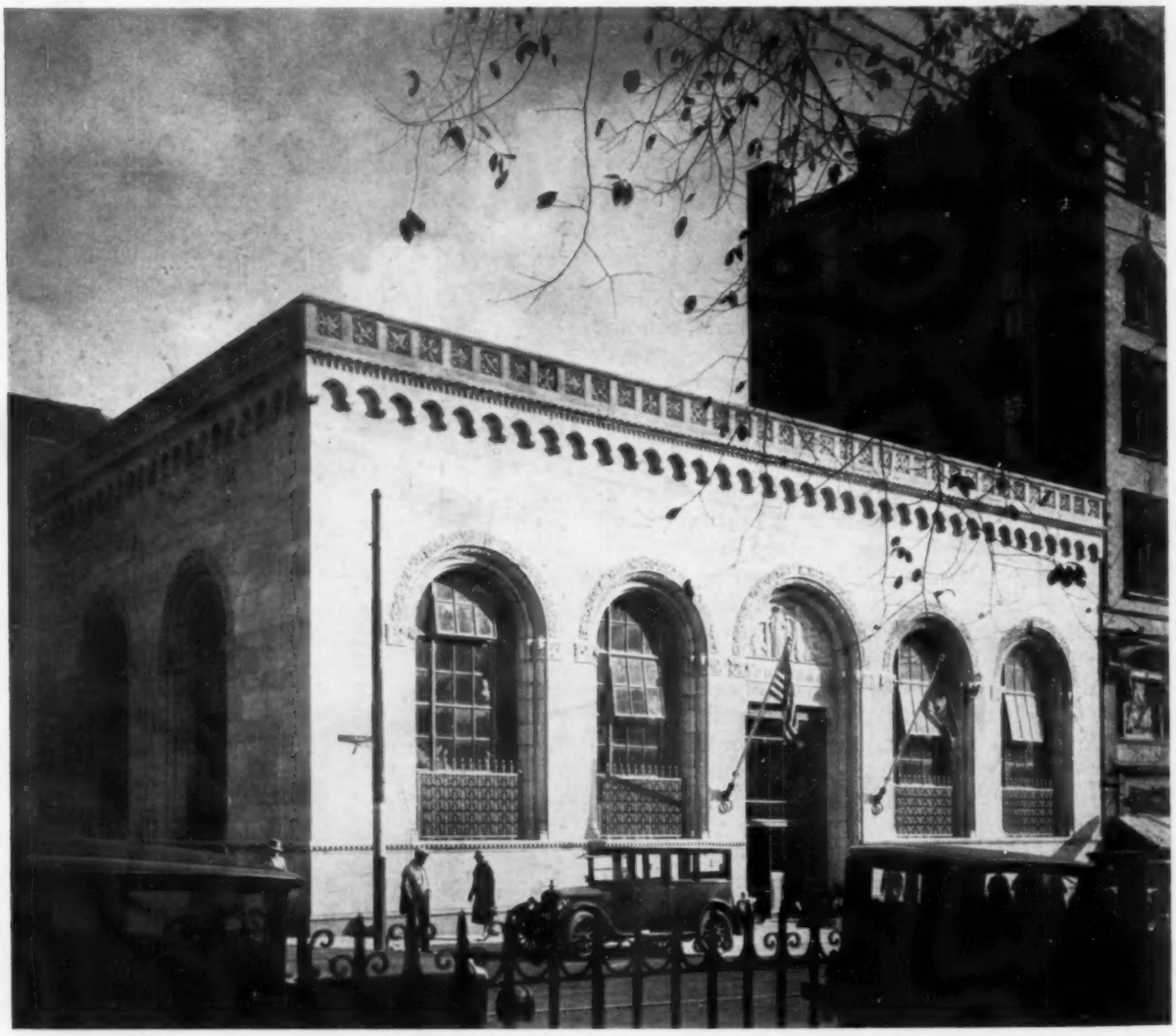


*Photo. Sigurd Fischer*

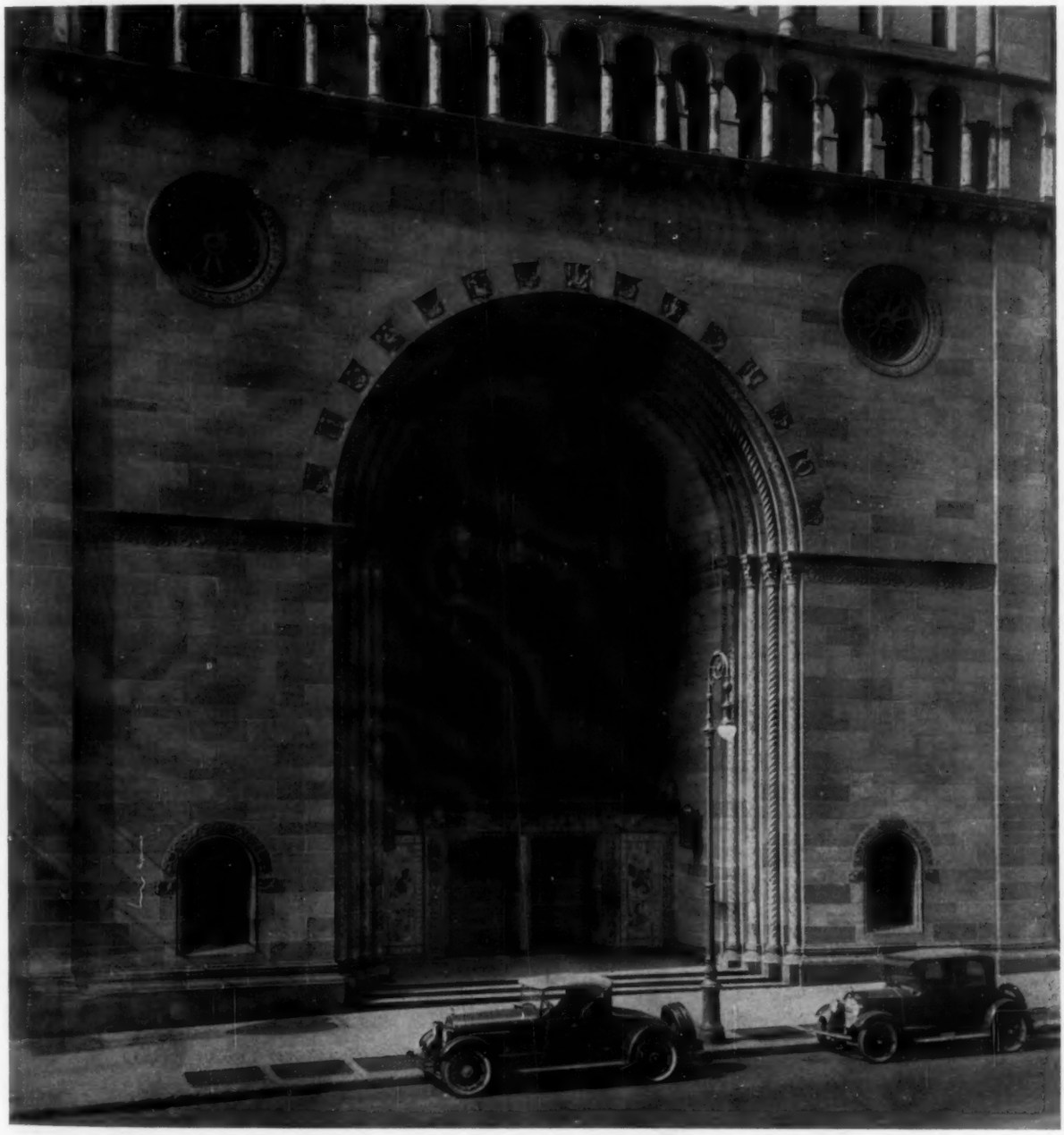
Dime Savings Bank, Waterbury, Conn.
York & Sawyer, Architects

# THE BOWERY SAVINGS BANK

BY

CHARLES G. LORING

THE differences real or imaginary, or rather the differences in reality and imagination, between New York and Boston are expressed in their bank buildings. A score of years ago the metropolitan banks expressed wealth and those of New England security,—an imperial, Roman wealth and a puritanical security. Both motives were appropriate, and each motive was a bona fide visualization of the banking ideals of the community. When architectural orders were used, the Corinthian typified luxury, and the Greek Doric typified solidity. What happened a score of years ago is out of date now; progress or acceleration, imagination or eclecticism, demands "something different," and the nineteen twenties are landmarked by the Bowery Savings Bank in New York and the Old Colony Trust Company in Boston. The first proclaims the beauties of wealth, the second commends the romance of traffic. Each is a step away from the conventional banking house, and each has pronounced individuality.



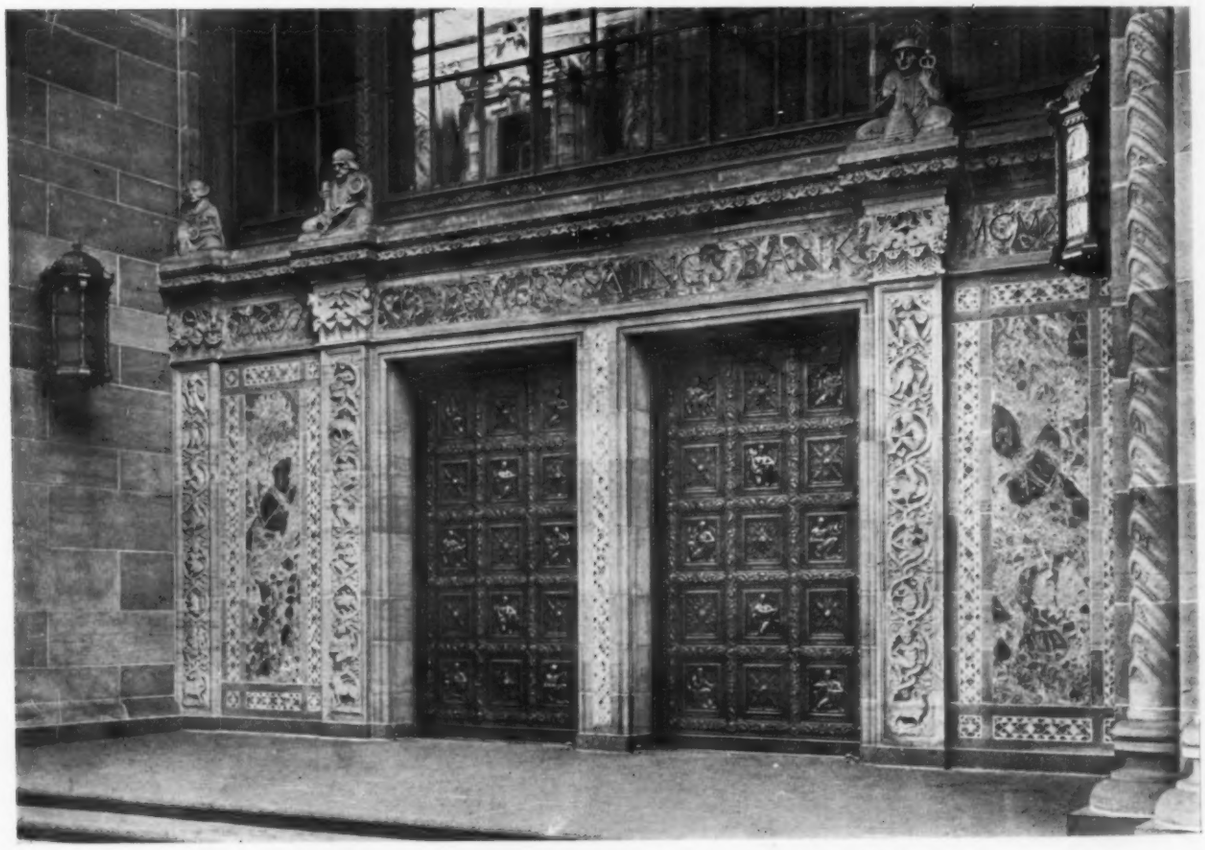
Bowery Savings Bank, New York

York & Sawyer, Architects

Portion of Main Banking Room

What happened a score of years ago in design is as out of date now as are the architectural criticisms of that time. The H. H. Richardsonian Romanesque was in dire disrepute; the proclamations of the preceding generation that it was the first real embodiment of the American style were forgotten. Such translations of Romanesque were abandoned because deep window reveals were impractical in an office building, since the expression of massive stone construction belied the age of steel, because it was a one-man style and would never reappear. Today there must be laughter in Parnassus when the architectural journals arrive;—but for a change in handwriting, a slight attenuation in detail, a softening of the color scheme, the exterior of the Bowery Savings Bank might have been evolved by the elder Richardson! Twenty years from now will this basilica under a hive of offices represent post-war New York? Will it represent a savings bank? Not to many, but to quote from "Hill's Rhetoric," it has unity, mass and coherence, and it is deemed so original that already it is being widely copied.

The 42nd Street home of the Bowery Savings Bank is not on the old, downtown highway, where "they do such things and they say such things"; in fact it will "never go there any more," nor does it recall the Knickerbocker Dutch of the Bouwerie. Instead it is a superb and tessellated hall, an Italian Romanesque temple to the god of money, set at the



Exterior of Main Entrance, Bowery Savings Bank, New York

York & Sawyer, Architects

focal point where more varied lines of traffic converge at more super-imposed levels than anywhere else on this spinning globe. It does not recall the corporation's past,—it bespeaks the bank's future.

The god who is served in this hall is a deity austere, omnipresent and grown great by watchfulness of little things. The enormous height, the bituminous dimness, the exquisitely aloof beauty, the minute doorways beside and below the triumphal arch of the two windows, half a hundred feet high, echo the solemn chant of "Every little bit added to what you've got makes just a little bit more." There are nearly two hundred thousand depositors in this mutual bank, and each one as he enters can say: "This was built for me; herein am I privileged." As he pauses before the little leather-covered chest, the original depository of 1834, now arked in crystal and set like a shrine with its saint's ossuary, he repeats to himself the ritual: "Behold what a great oak has grown from this little acorn!" Here is a temple in which to meditate on beauty, coöperation, and the insignificance of the individual.

The scale of the interior visualizes the dreams of the statisticians. "If all the nickels deposited in this bank were piled one upon the other, they would form a shaft reaching from the subway to Olympia. Each fragment of mosaic, each block of polished marble, each slab of travertine, represents a stone not left unturned by a depositor in this bank."

Detail in Main Banking Room

Interior of Entrance Vestibule, Bowery Savings Bank, New York

York & Sawyer, Architects

Around the exterior portals there is symbolism to encourage the true believer. Messrs. York & Sawyer and Mr. Ricci have boldly composed figures of Industry and Security attended by the nut-gathering squirrel, the wise owl, the watchful dog, the self-sacrificing pelican, the busy bee, the crafty fox and, —unless the execution is not legible—the boar or pig. Among the Byzantine foliage nestle coins, cog wheels, hour glasses, treasure chests, scrolls of accounts, and a highly conventionalized "%." Within the bronze gates, raised at a respectful distance, is the triforium screen with a hierarchy of 21 squat immortal penny-savers in pierced levanto. The very material suggests the skill of the Levantine Greeks, and it is supposed that the group of patrons includes Ben Franklin gaining a penny, Midas touching gold, Peter Stuyvesant real-estating with the Indians, Dame Opportunity knocking at the door, and Hetty Green.

The architects were given full command; theirs not to worry about cost per cubic foot nor the introduction of a mezzanine floor for clerical space; they were welcome to determine the height of the banking room best suited to the floor area, and behold they merit well from the public! They could choose what style they pleased, and any illuminated debater on the arts could, with equal logic, condemn or praise their choice. They had an ample budget and, presto, signed a cost-plus contract on a falling market. Fortune allowed them to mullion the Titan windows in bronze at the original estimated cost of iron, and the saving in paint and replacement will, so it is said, pay for the bronze in a score of years; and a stone interior of course requires no upkeep,— it typifies economy. No wonder the happy authors sang the song of savings in the walls and floors and counters, using the richest of all conceivably rich marbles. It is all so elegantly superlative that symbolism finds its last expressive bit in the reveals of the interior arches, where the toiling depositor can gaze on centaurs, hippogriffs, Pegasus and gleesome lions with foliated tails. Here is a castle in the clouds brought to earth, and the ticket of admission is only a stiff little deposit book.

Some small-towners, some conservatives have carped at the building's grandiloquence and extravagance, but on authority it is reported that the architects are satisfied, and the board of governors is satisfied; they have their building and they have their free advertising, and the depositors are satisfied; they get their interest both in cash and in beauty, and even the man in the street (there is usually one man in the street with a *flair* for architecture) is satisfied. "And that," said John, "is that."

Interior, Bowery Savings Bank, New York
York & Sawyer, Architects

GENERAL VIEW

*Photos. Miles Berne*

BANKING ROOM

*Plan on Back*

BRANCH OF SECURITY TRUST AND SAVINGS BANK, COMPTON, CAL.

A. C. ZIMMERMAN AND RUDOLPH MEIER, ARCHITECTS

COST AND CONSTRUCTION DATA

Type of Construction. Steel frame; brick exterior walls; partitions of wood, metal lath, and plaster.

Exterior Material. Indiana limestone.

Windows. Wood.

Counter Screens. Marble and bronze.

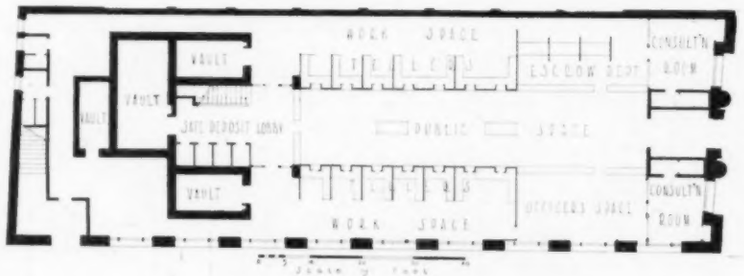
Type of Lighting. Direct.

Heating. Gas, steam radiation.

Date of Contract. July 9, 1923.

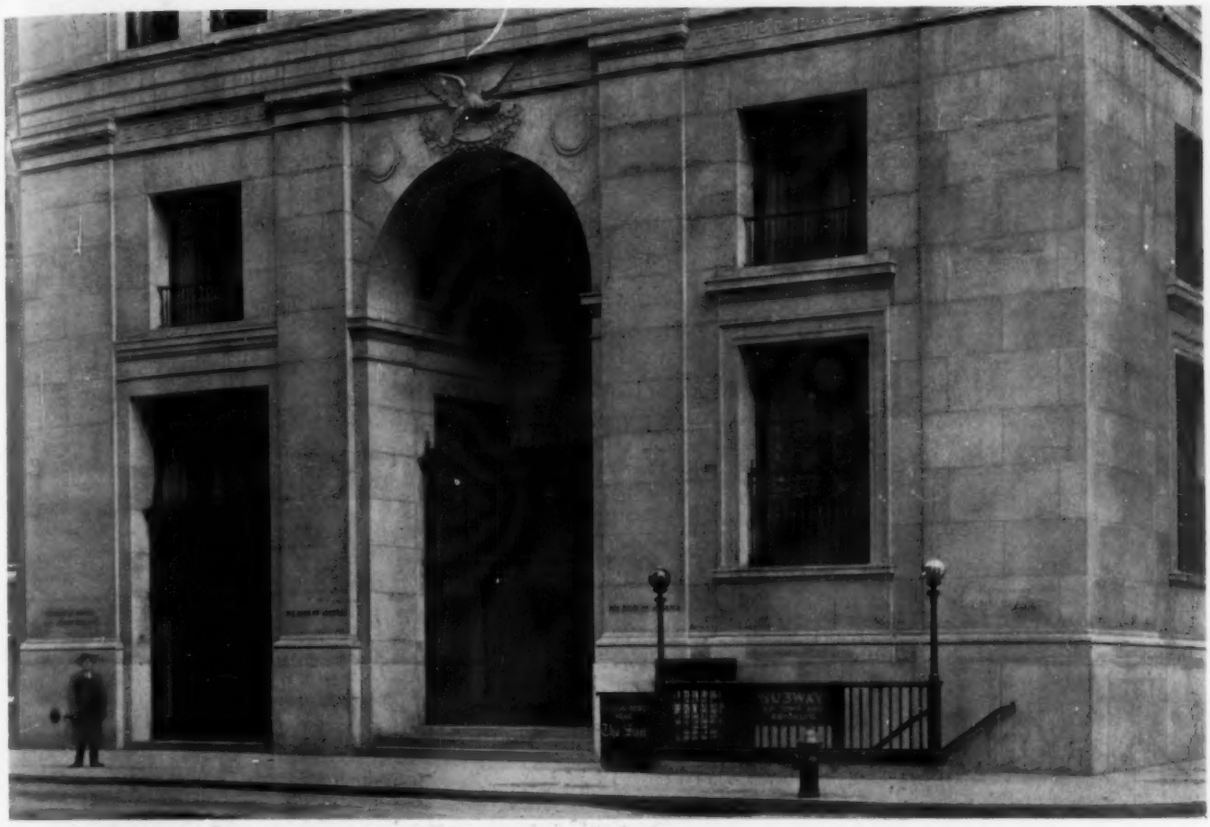
Total Cost of Building. $131,000.

Cubic Foot Cost. 42.5 cents.




PLAN, BRANCH OF SECURITY TRUST AND SAVINGS BANK, COMPTON, CAL.

A. C. ZIMMERMAN AND RUDOLPH MEIER, ARCHITECTS



ENTRANCE FACADE

*Plans on Back*

PUBLIC LOBBY

BANK OF AMERICA, NEW YORK

TROWBRIDGE & LIVINGSTON, ARCHITECTS

COST AND CONSTRUCTION DATA

Type of Construction. Fireproof.

Exterior Materials. Limestone and brick.

Interior Materials. Marble in banking quarters.

Windows. Steel.

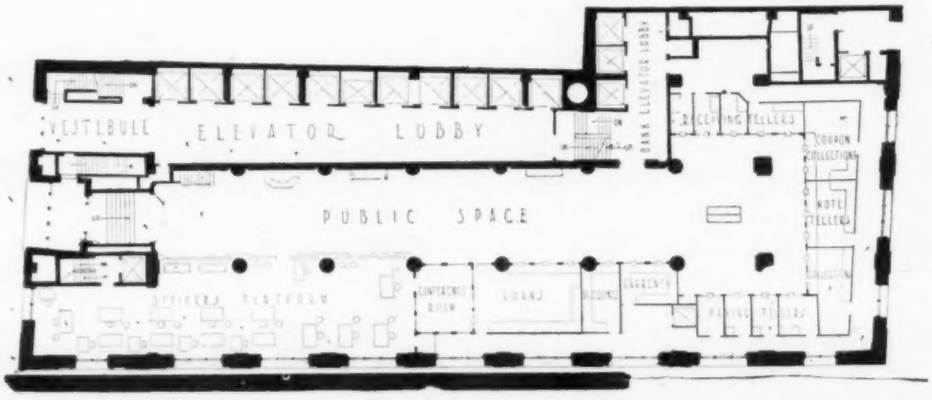
Counter Screens. Marble, bronze and iron.

Vault and Safe Deposit Provision. Two-story vault.

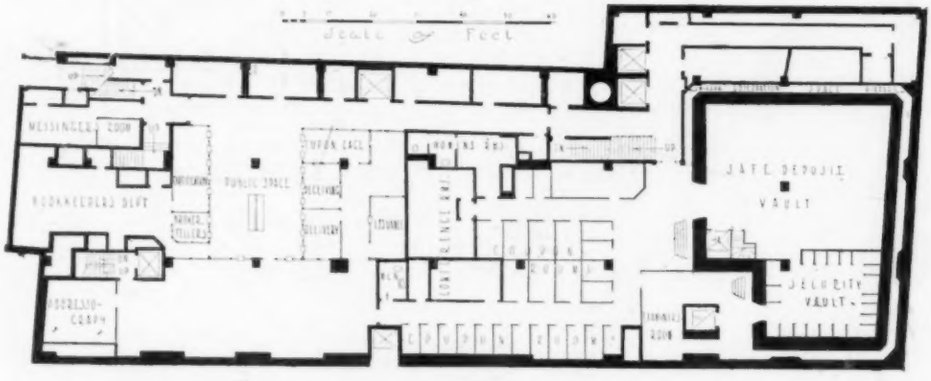
Type of Lighting. Direct.

Year of Contract. 1924.

Cubic Foot Cost. 67 cents, including bank equipment.



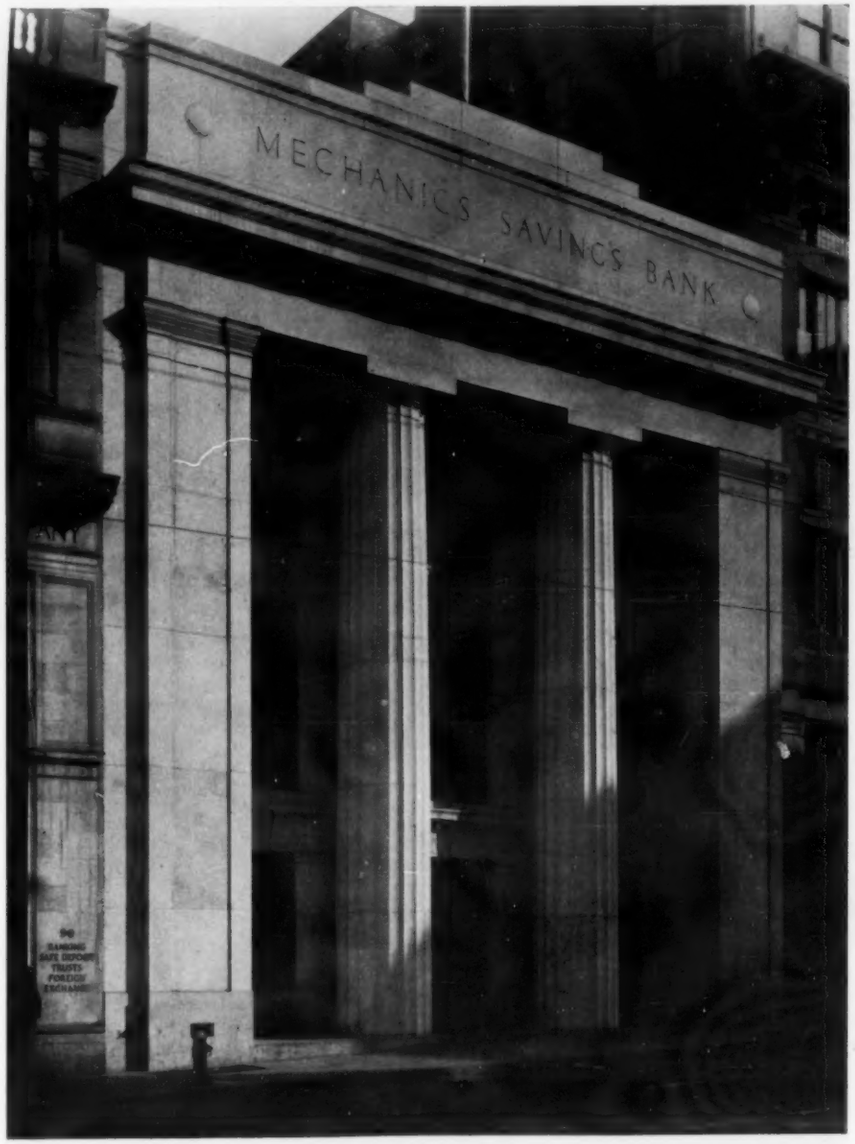

FIRST FLOOR




BASEMENT

PLANS, BANK OF AMERICA, NEW YORK

TROWBRIDGE & LIVINGSTON, ARCHITECTS




FRONT ELEVATON

BANKING ROOM

*Plan on Back*

MECHANICS SAVINGS BANK, HARTFORD
BENJAMIN WISTAR MORRIS, ARCHITECT

COST AND CONSTRUCTION DATA

Type of Construction: Reinforced concrete,—"tin pan" type.

Exterior Materials: Granite facade.

Interior Materials: Marble, bronze, plaster, wood.
Windows: Steel.

Counter Screens: Marble and bronze.

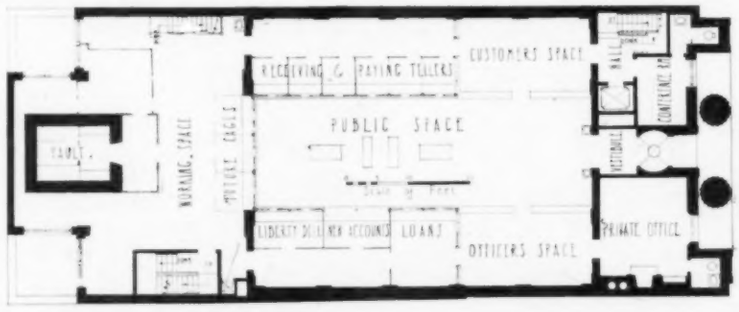
Vault and Safe Deposit Provision: Bank vault only.

Type of Lighting: Direct and semi-indirect.

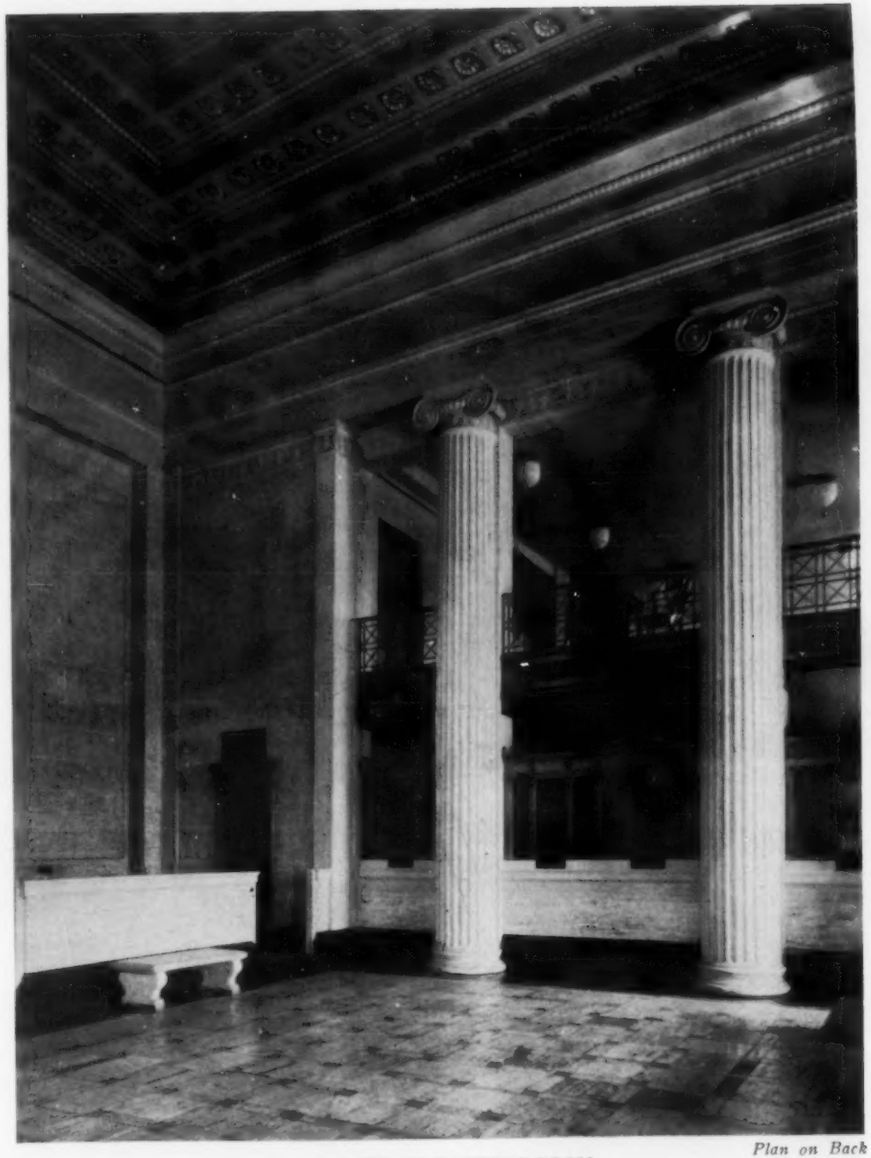
Heating and Ventilating: Steam heat. Forced ventilation, supply and exhaust system.

Date of Contract: November, 1923.

Cubic Foot Cost: $1.18.




PLAN, MECHANICS SAVINGS BANK, HARTFORD
BENJAMIN WISTAR MORRIS, ARCHITECT

*Photos. Tebbs & Knell, Inc.* *Plan on Back*

GENERAL VIEW — CORNER OF BANKING ROOM

BRANCH, FEDERAL RESERVE BANK OF ATLANTA, BIRMINGHAM

WARREN, KNIGHT & DAVIS, ARCHITECTS

COST AND CONSTRUCTION DATA

Type of Construction. Reinforced concrete; steel roof.

Exterior Materials. Brick and granite.

Interior Materials. Marble, bronze, plaster.

Windows. Steel.

Counter Screens. Bronze and marble.

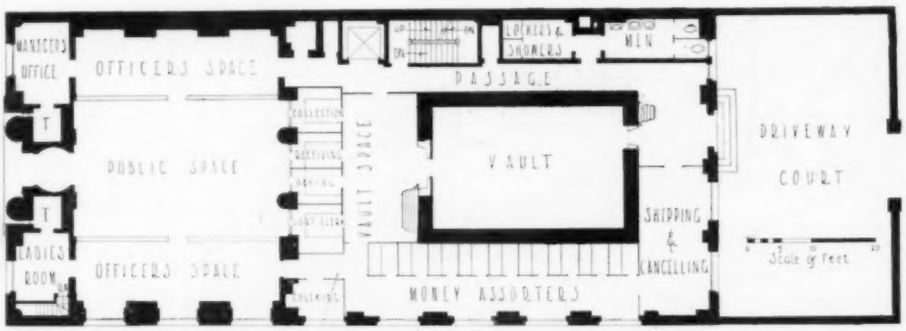
Type of Lighting. Main banking room, indirect lighting; office and work space, direct light units.

Heating and Ventilating. Mechanical ventilation and direct radiators.

Year of Contract. 1925.

Total Building Cost. $340,000.

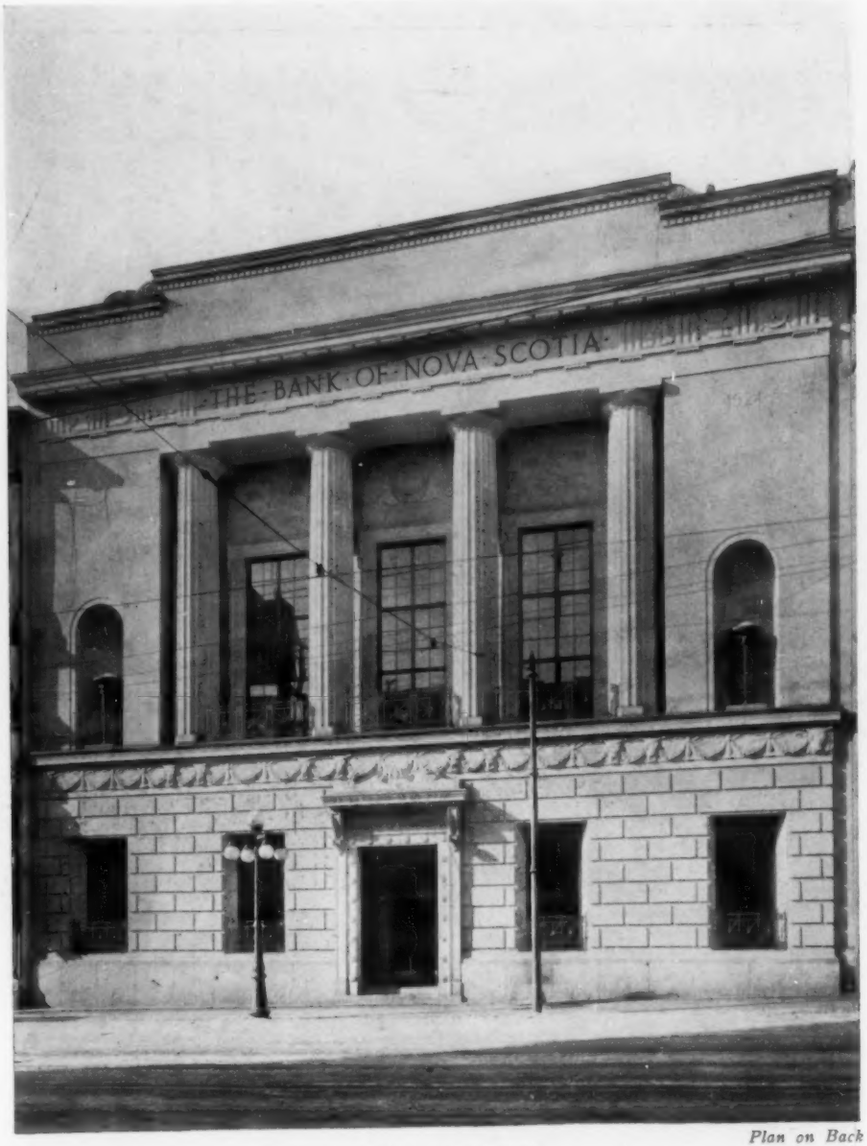
Cubic Foot Cost. $1.




PLAN, BIRMINGHAM BRANCH, FEDERAL RESERVE BANK
WARREN, KNIGHT & DAVIS, ARCHITECTS

*Photos. Pringle & Booth*

BANKING ROOM




*Plan on Back*

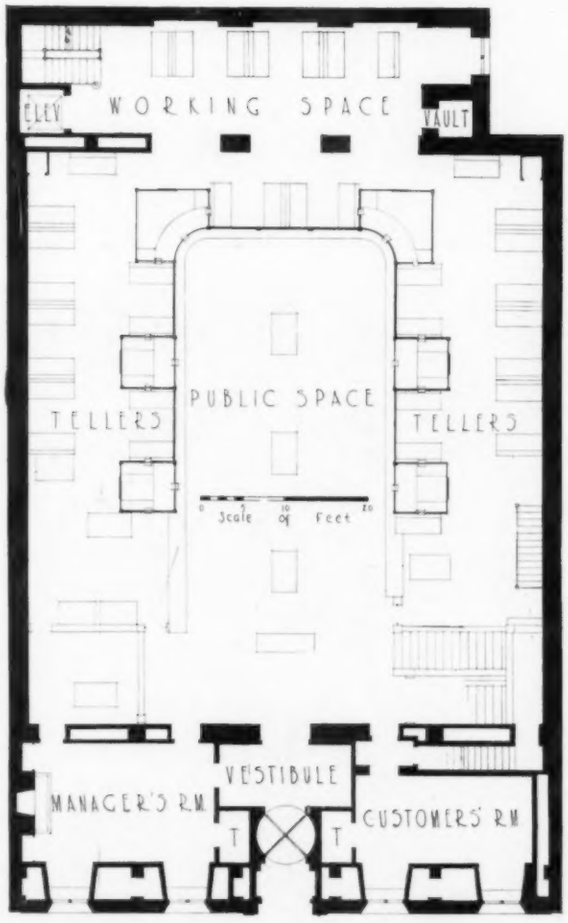
FRONT ELEVATION

THE BANK OF NOVA SCOTIA, OTTAWA

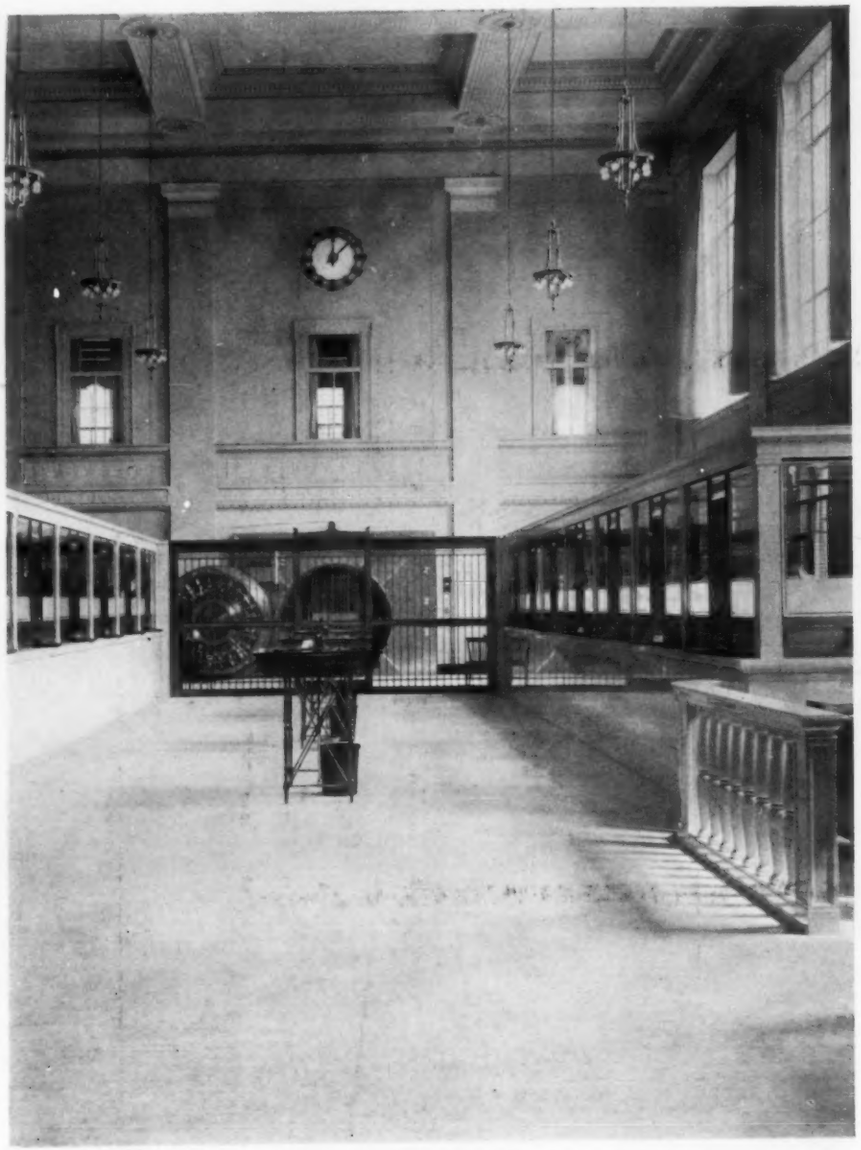
JOHN M. LYLE, ARCHITECT

## COST AND CONSTRUCTION DATA

Type of Construction. Steel frame; reinforced concrete floors.
Exterior Material. Indiana limestone.
Interior Materials. Marble walls and trim, and pink marble floors. Upper walls of cast Caen stone, with plaster ceiling.
Windows. Bronze.
Counter Screens. Marble and bronze.
Vault and Safe Deposit Provision. Island type vault of heavily armored concrete lined with special steel linings in several thicknesses.
Type of Lighting. Direct.
Heating and Ventilating. Low-pressure steam; direct radiation, with supply and exhaust ventilation.
Date of Contract. September, 1923.
Total Building Cost. $332,286.39.
Cubic Foot Cost. 73 cents.




PLAN, THE BANK OF NOVA SCOTIA, OTTAWA
JOHN M. LYLE, ARCHITECT



*Photos. J. C. Maugans*

BANKING ROOM


*Plan on Back*

GENERAL VIEW

THE PUTNAM TRUST COMPANY, GREENWICH, CONN.
MORGAN, FRENCH & CO., INC., ARCHITECTS

COST AND CONSTRUCTION DATA

Type of Construction. Fireproof, excepting roof.

Exterior Materials. Granite base; remainder buff Indiana limestone.

Interior Materials. Plastered walls and ornamental ceilings. Walls in imitation of Caen stone. Mahogany cabinet work. Tavernelle marble wainscoting for officers' space railings, etc. Travertine floor in public space.

Windows. Steel casement sash.

Counter Screens. Tavernelle marble.

Vault and Safe Deposit Provision. Combination fund and safe deposit vault in basement, with 16-inch emergency door; refrigerated fur storage vault with capacity for 4,000 garments; large storage vault for silver and other bulky materials.

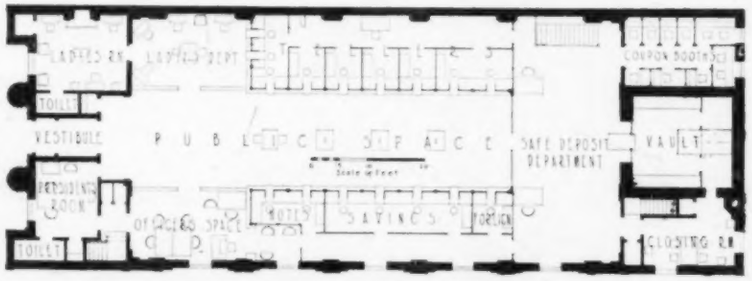
Type of Lighting. Direct.

Heating. Two-pipe, low-pressure steam.

Date of Contract. July 2, 1925.

Total Building Cost. $278,570 for building and equipment.

Cubic Foot Cost. 42.5 cents, based on construction cost of $168,370.




PLAN, THE PUTNAM TRUST COMPANY, GREENWICH, CONN.

MORGAN FRENCH & CO., INC., ARCHITECTS


STREET FACADE

*Photos. Padilla Co.*

*Plan on Back*

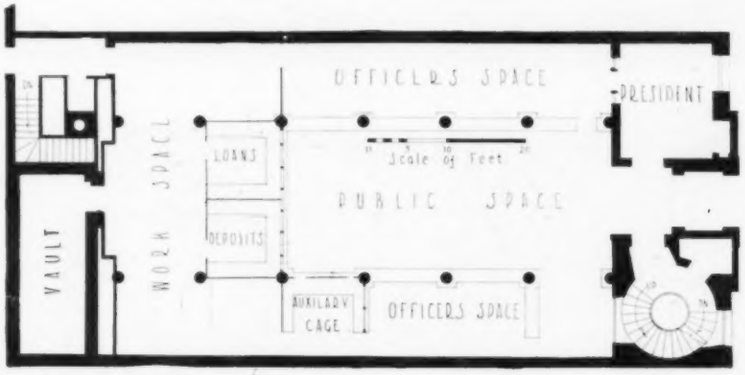
GENERAL BANKING ROOM

CALIFORNIA SECURITY LOAN CORPORATION, PASADENA

WALLACE NEFF, ARCHITECT

COST AND CONSTRUCTION DATA

Type of Construction. Reinforced concrete, with tile roof.
Exterior Materials. Stucco with handmade tile.
Interior Materials. Plaster, with colored tile and woodwork of pine with walnut finish.
Windows. Wire glass in metal sash and frames, and plate glass in wood sash and frames.
Counter Screens. Black marble counters, with wrought iron screens.
Heating and Ventilating. Steam heat and air-washed cooling type ventilation.
Type of Lighting. Direct.
Date of Contract. September, 1925.
Total Cost of Building. $73,000.
Cubic Foot Cost. 51.5 cents.




PLAN, CALIFORNIA SECURITY LOAN CORPORATION, PASADENA

WALLACE NEFF, ARCHITECT

ENTRANCE FACADE

*Photos. Caufield & Shook*

*Plan on Back*

BANKING ROOM

FEDERAL LAND BANK, LOUISVILLE

D. X. MURPHY & BRO., ARCHITECTS

COST AND CONSTRUCTION DATA

Type of Construction. Fireproof, with steel frame and reinforced concrete slabs.

Exterior Materials. Limestone and brick.

Interior Materials. Marble and plaster; linoleum and cork flooring.

Windows. Steel and hollow metal.

Vault and Safe Deposit Provision. Fireproof vaults with steel reinforcement.

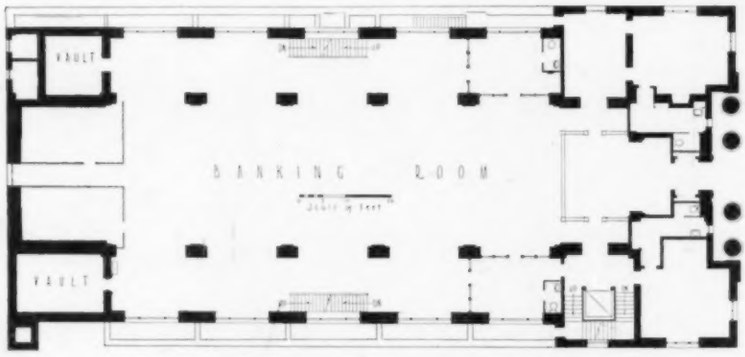
Type of Lighting. Direct.

Heating and Ventilating. Split system.

Year of Contract. 1925.

Total Building Cost. $376,389.

Cubic Foot Cost. 49.75 cents.




PLAN, FEDERAL LAND BANK, LOUISVILLE

D. X. MURPHY & BRO., ARCHITECTS

GENERAL VIEW

ENTRANCE DETAIL

BANKING ROOM

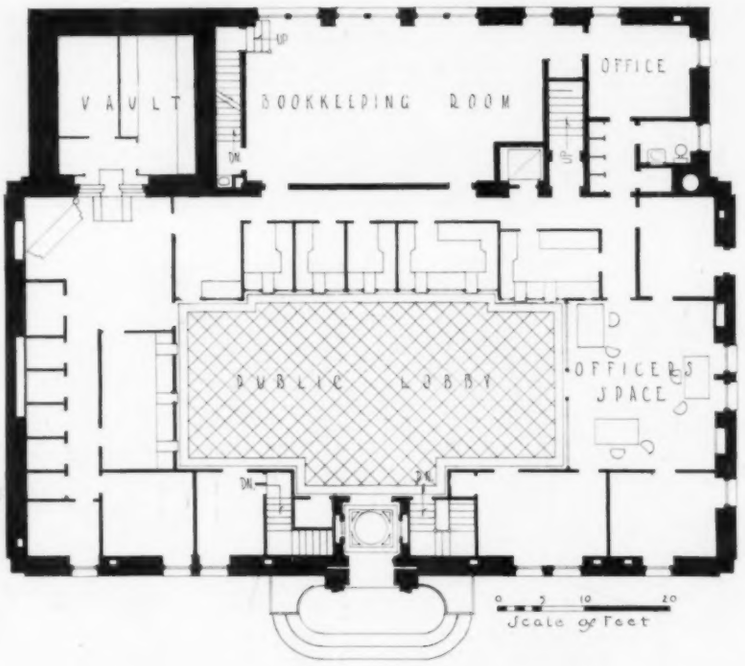
*Plan on Back*

DANBURY NATIONAL BANK, DANBURY, CONN.

PHILIP SUNDERLAND & EDMUND WATSON, ARCHITECTS; JOHN MEAD HOWELLS, CONSULTING ARCHITECT

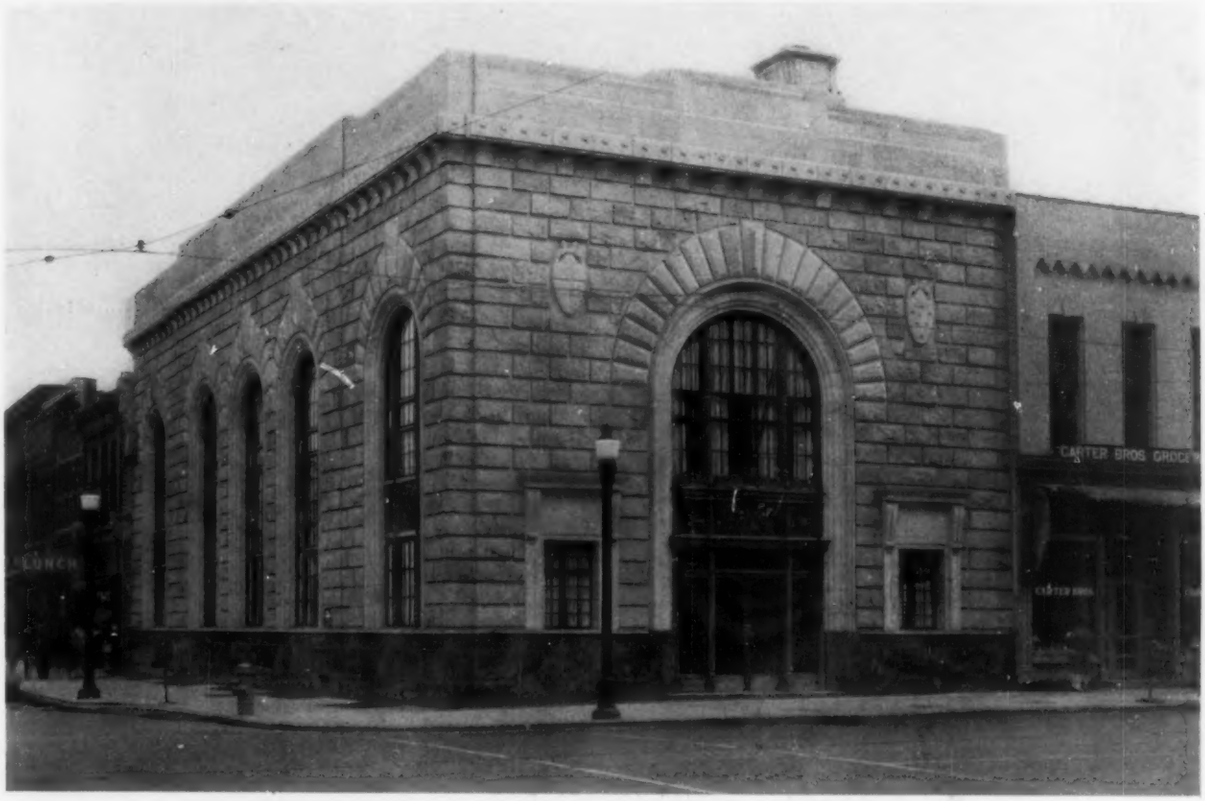
CONSTRUCTION DATA

Type of Construction. Fireproof.
Exterior Materials. Indiana limestone.
Interior Materials. Marble and bronze.
Windows. Metal sash of special design.
Counter Screens. Solid marble and bronze.

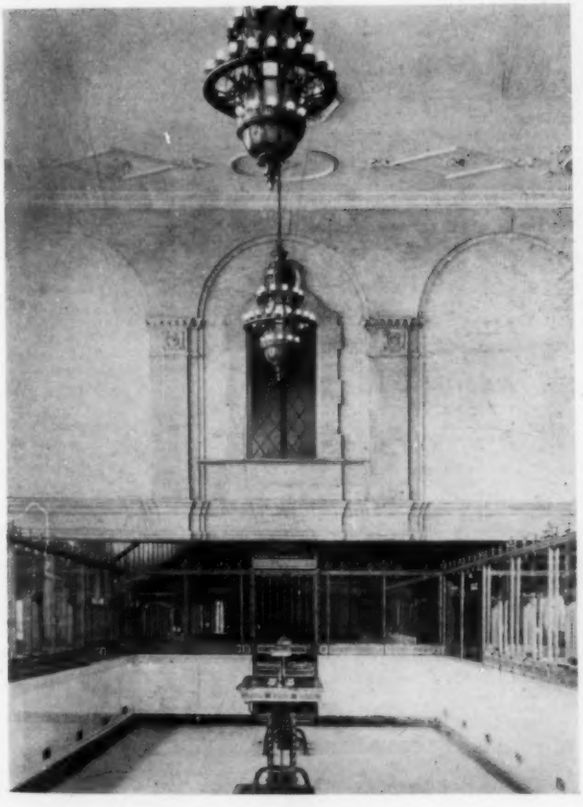



DANBURY NATIONAL BANK, DANBURY, CONN.

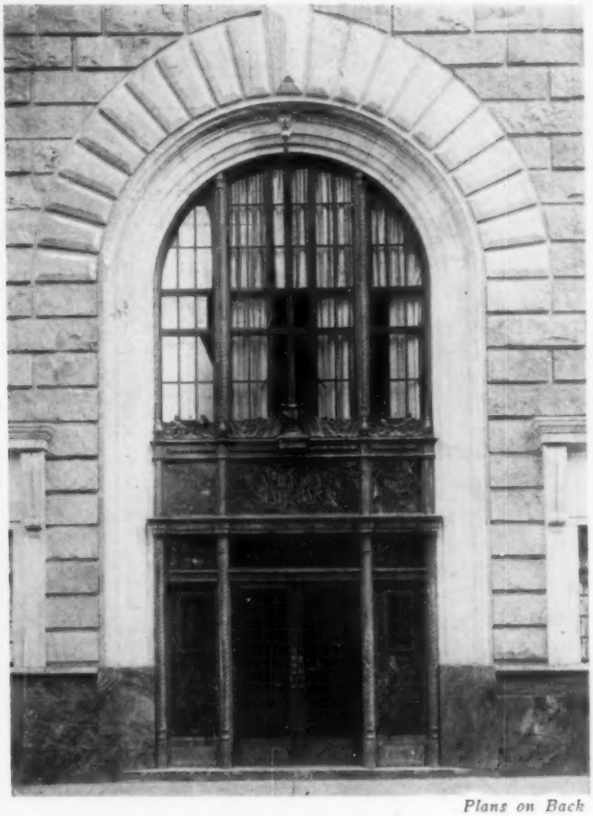
PHILIP SUNDERLAND & EDMUND WATSON, ARCHITECTS; JOHN MEAD HOWELLS, CONSULTING ARCHITECT




GENERAL VIEW



BANKING ROOM



ENTRANCE DETAIL

*Plans on Back*

AMERICAN STATE BANK, SAGINAW, MICH.

ROBERT B. FRANTZ & JAMES A. SPENCE, ARCHITECTS

COST AND CONSTRUCTION DATA

Type of Construction. Steel frame designed to carry ten additional stories. Concrete floor slabs.

Exterior Materials. Sandstone; polished granite base.

Interior Materials. Marble floors and wainscot; rubber tile in safe deposit section, and oak floors in offices. Plaster walls and ceilings.

Windows. Steel; lower vents casement; upper vents crank-operated.

Counter Screens. Marble counter with wrought iron, bronze and glass screens.

Vault and Safety Deposit Provision. Combined trunk and silver storage on basement floor.

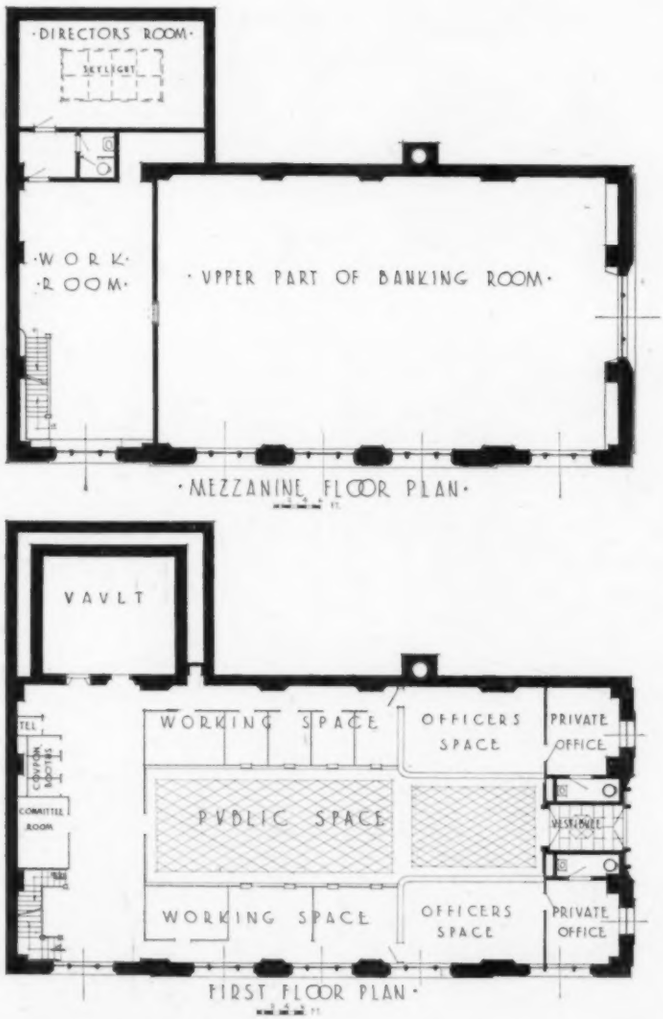
Lighting. Direct and indirect.

Heating and Ventilating. Vacuum system, direct and indirect, with thermostatic control.

Date of Contract. September 16, 1926.

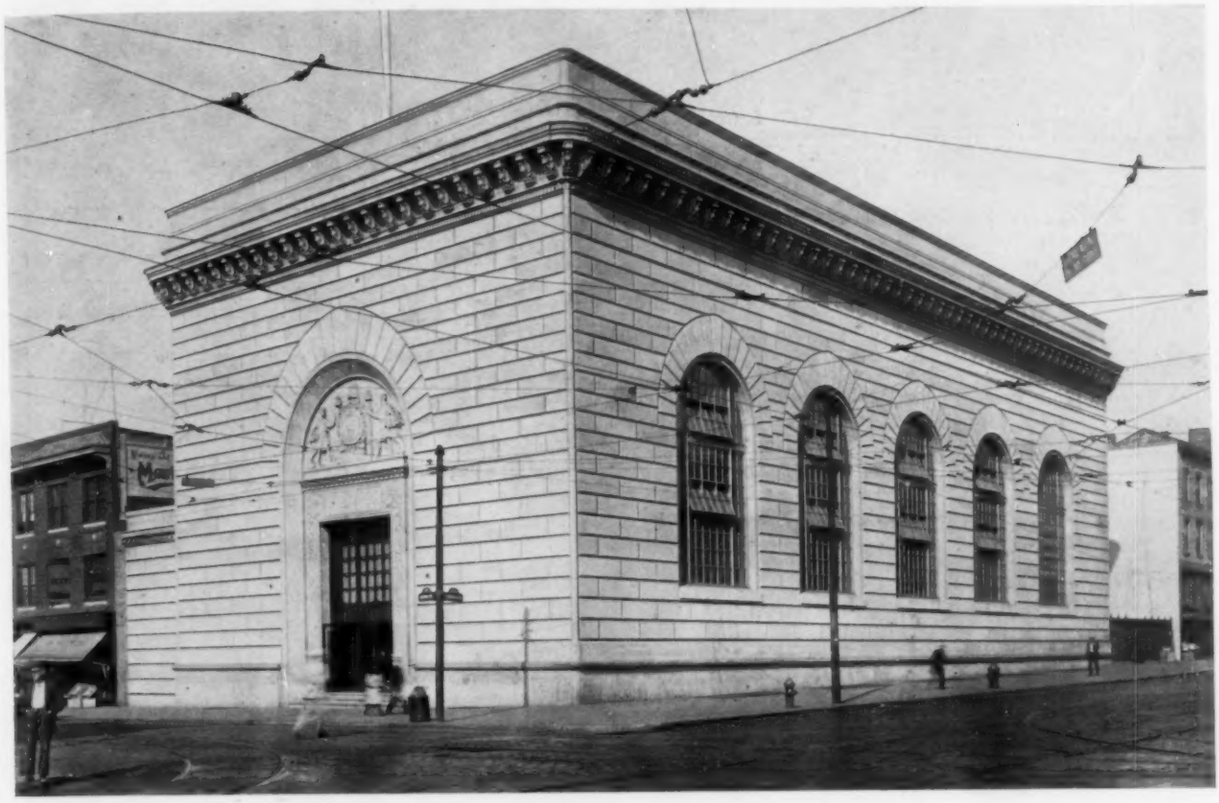
Total Building Cost. $200,000.

Cubic Foot Cost. $1.05.




PLANS, AMERICAN STATE BANK, SAGINAW, MICH.

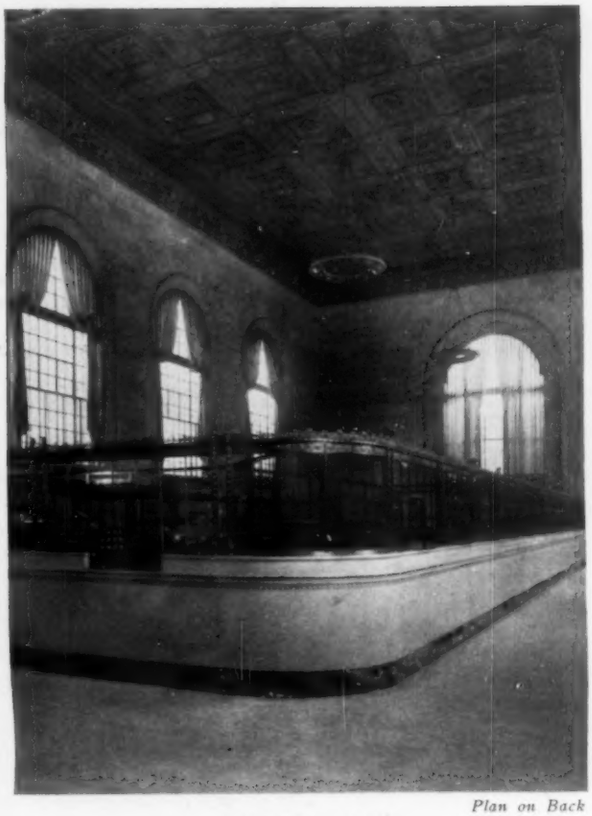
ROBERT B. FRANTZ & JAMES A. SPENCE, ARCHITECTS



GENERAL VIEW

*Photos. Amemya*

ENTRANCE LOBBY



*Plan on Back*

BANKING ROOM

SOUTH BROOKLYN SAVINGS BANK, BROOKLYN

McKENZIE, VOORHEES & GMELIN, ARCHITECTS

COST AND CONSTRUCTION DATA

Type of Construction: Fireproof throughout.

Exterior Materials: Granite base; limestone facade.

Interior Materials: Marble floors and wainscot; imitation stone walls.

Windows. Iron.

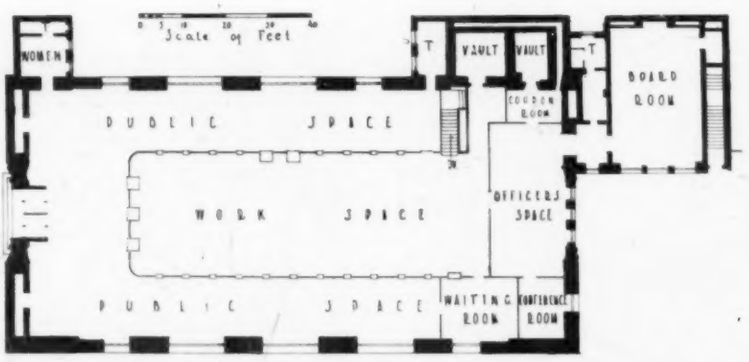
Counter Screens: Marble and bronze.

Type of Lighting: Direct.

Heating: Steam.

Date of Contract: November 17, 1922.

Total Cost: $650,000, including furniture and fixtures.



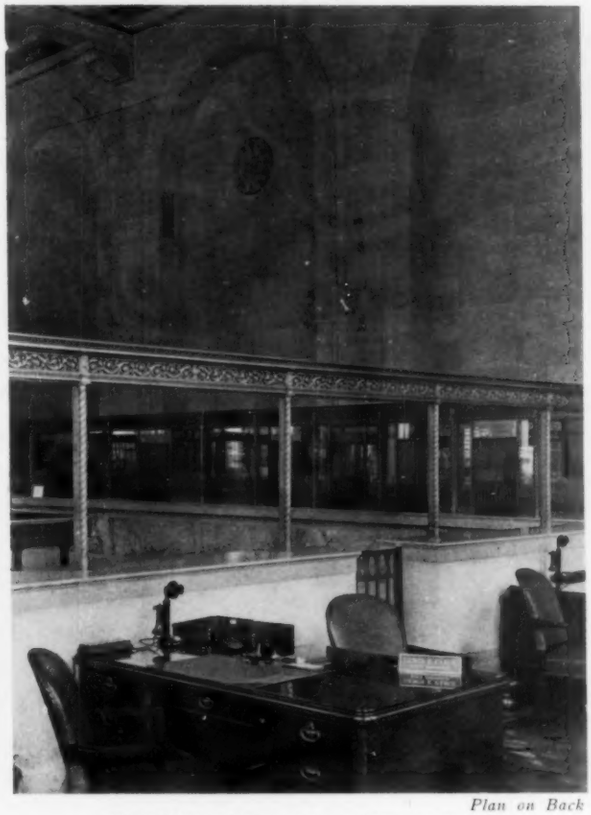

PLAN, SOUTH BROOKLYN SAVINGS BANK

McKENZIE, VOORHEES & GMELIN, ARCHITECTS

GENERAL VIEW

*Photos. Peasley-Jordan*

ENTRANCE VESTIBULE



*Plan on Back*

OFFICERS' SPACE AND BANK SCREEN

BRANCH OF BANK OF CALIFORNIA, PORTLAND, ORE.

A. E. DOYLE & ASSOCIATE, ARCHITECTS

COST AND CONSTRUCTION DATA

Type of Construction. Steel and concrete.

Exterior Materials. Marble, terra cotta, and tile roof.

Interior Materials. Marble, plaster and bronze.

Windows. Metal frames.

Counter Screens. Marble and bronze.

Vault and Safe Deposit Provision. 18-inch reinforced concrete.

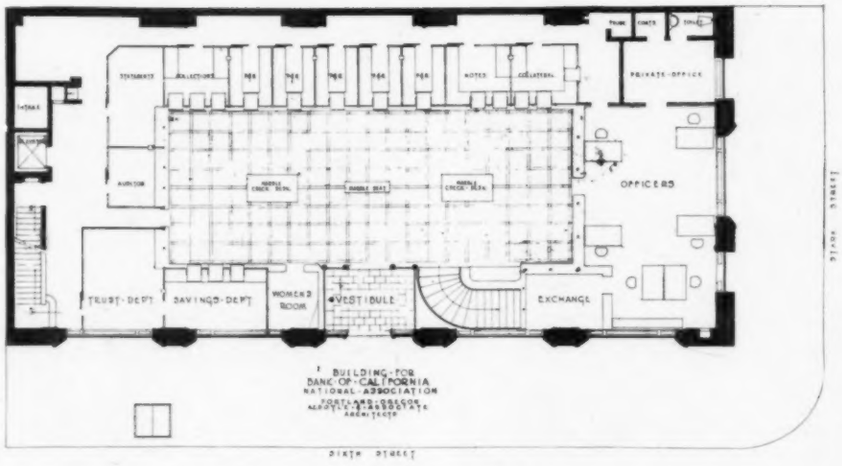
Type of Lighting. Banking room, X-ray indirect; remainder of building, direct.

Heating and Ventilating. Direct radiation and fan system.

Year of Contract. 1924.

Total Building Cost. Approximately $414,000.

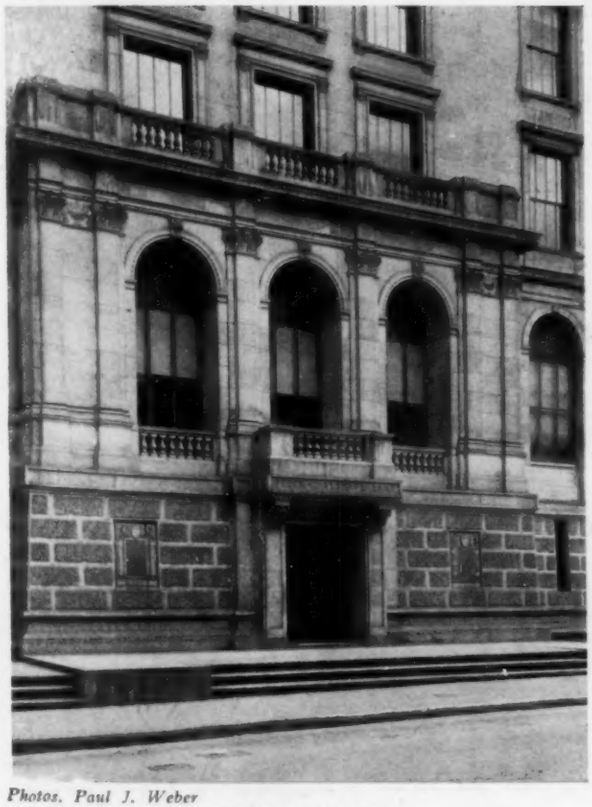
Cubic Foot Cost $1.03, based on complete cost, including furniture, fixtures and architects' fees.




PLAN, BRANCH OF BANK OF CALIFORNIA, PORTLAND, ORE.

A. E. DOYLE & ASSOCIATE, ARCHITECTS

GENERAL VIEW



*Photos, Paul J. Weber*

ENTRANCE DETAIL

*Plans on Back*

MEMBERS' COURT

FEDERAL RESERVE BANK, BOSTON

R. CLIPSTON STURGIS, ARCHITECT

COST AND CONSTRUCTION DATA

Type of Construction. Fire resistant (first class).

Exterior Material. Limestone.

Windows. Bronze.

Counter Screens. Cast iron and glass.

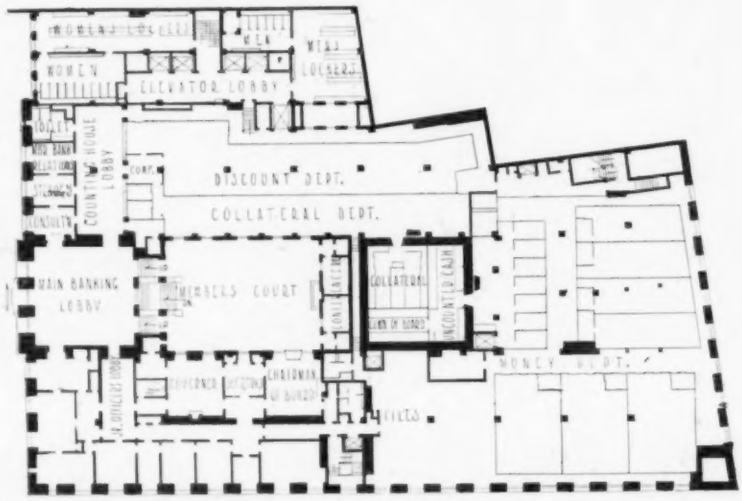
Vault and Safe Deposit Provision. Special.

Type of Lighting. Direct.

Heating and Ventilating. Direct heat. Forced circulation of outside air in whole or in part.

Date of Contract. January 1 ,1920.

Cubic Foot Cost. $1.05.




FIRST FLOOR

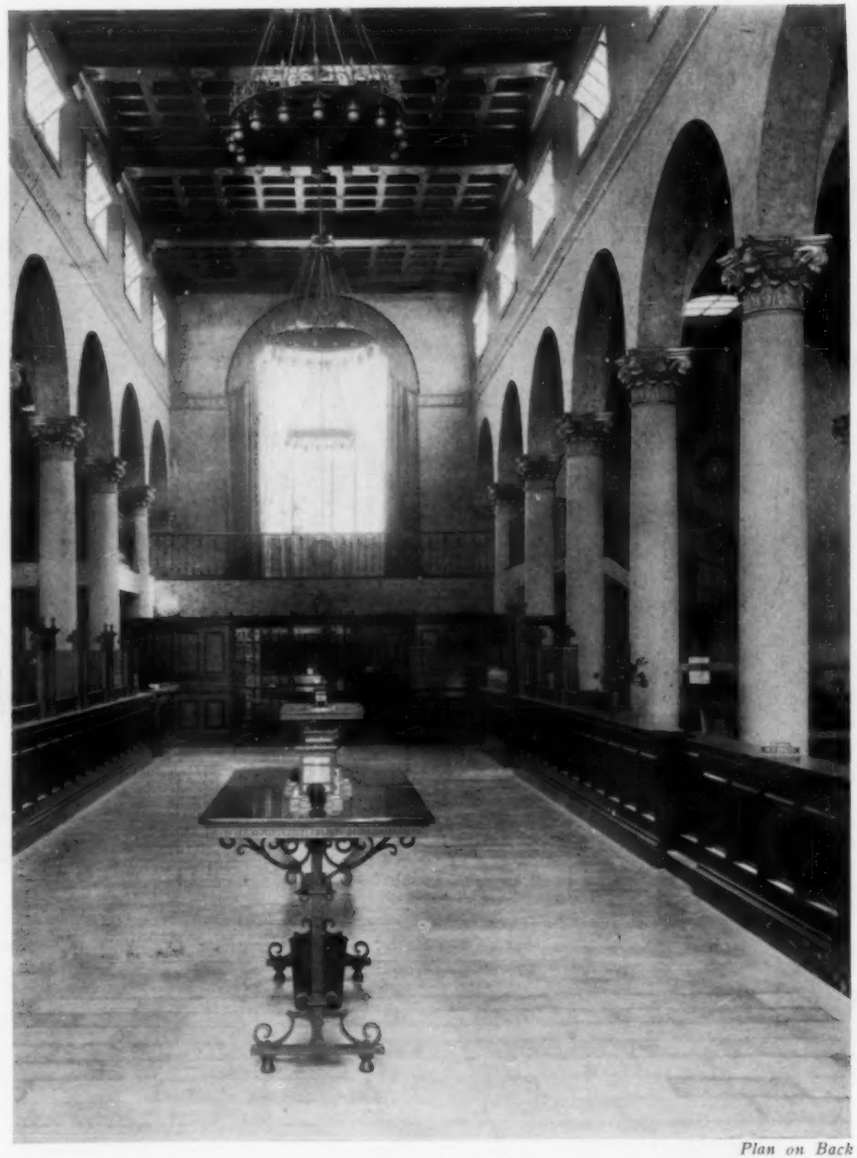

GROUND FLOOR

PLANS, FEDERAL RESERVE BANK, BOSTON

R. CLIPSTON STURGIS, ARCHITECT


*Photos. A. E. Arnold*

FRONT ELEVATION



*Plan on Back*

PUBLIC SPACE

THE CENTRAL NATIONAL BANK OF PASADENA
CYRIL BENNETT & FITCH H. HASKELL, ARCHITECTS

COST AND CONSTRUCTION DATA

Type of Construction. Garage in basement under whole area. Fireproof to first floor. Semi-fireproof above. Steel columns; brick; metal lath.

Exterior Materials. Cast stone; wrought and cast iron

Interior Materials. Marble floor and base. Plaster walls and ceilings.

Windows. Steel sash.

Counter Screens. Marble, wood, iron and glass.

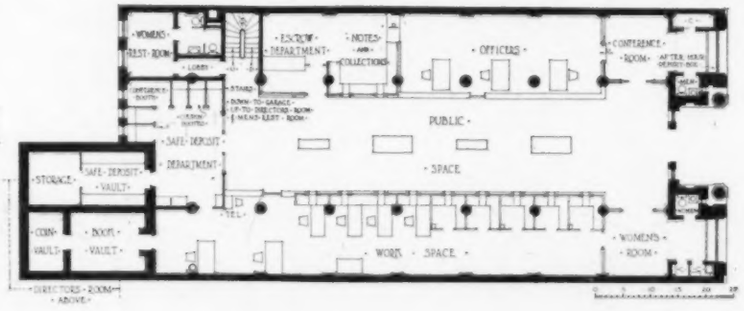
Type of lighting. Direct.

Heating. Hot air.

Year of Contract. 1924.

Total Cost. (Building and fixtures, not including vault doors), $90,000.

Cubic Foot Cost, including garage. 35.5 cents.

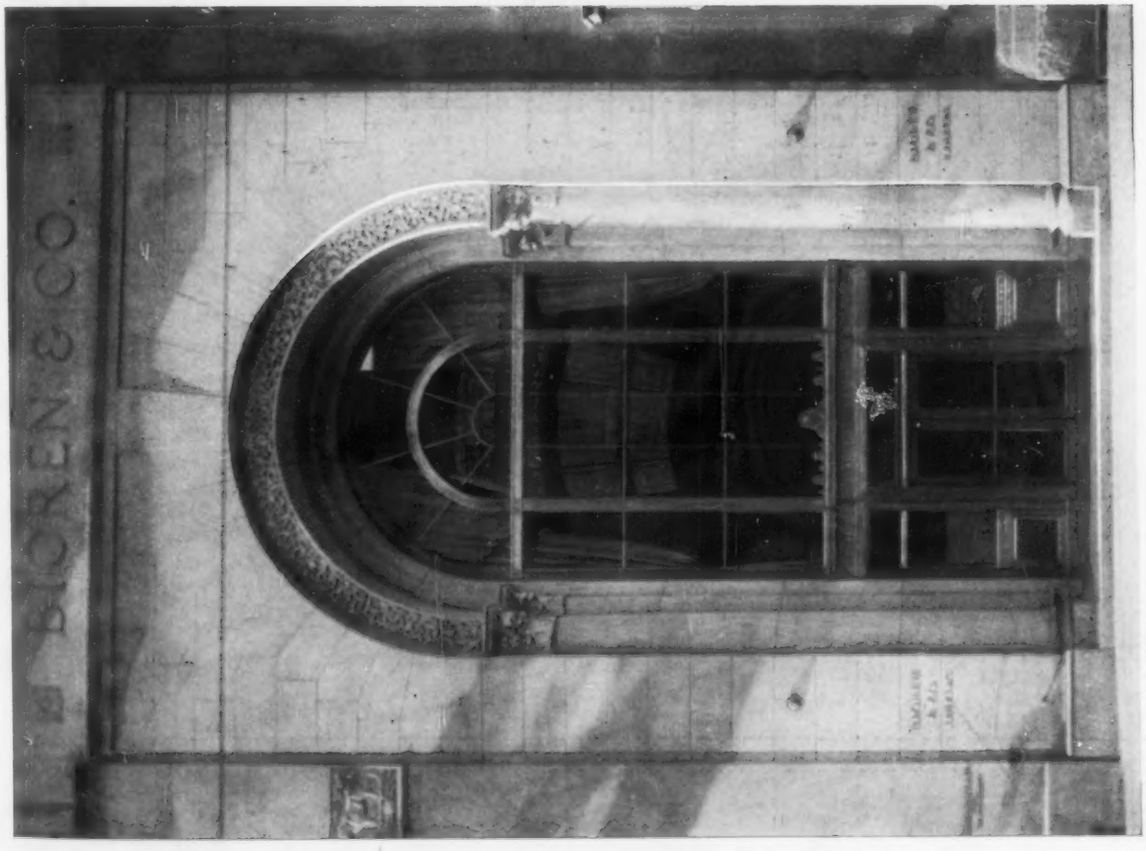



PLAN, THE CENTRAL NATIONAL BANK OF PASADENA

CYRIL BENNETT & FITCH H. HASKELL, ARCHITECTS

*Plan on Back*

BANKING ROOM



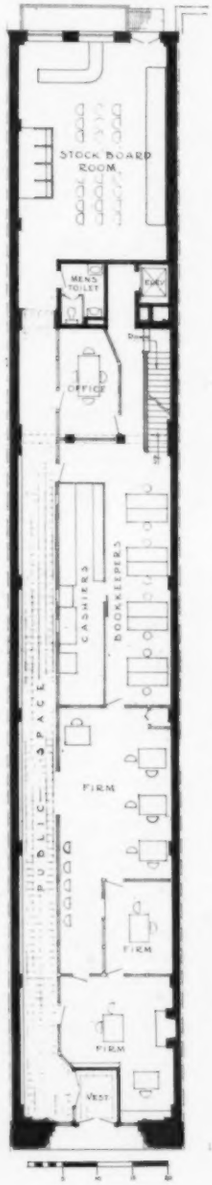

*Photos. William H. Rittase*

FRONT ENTRANCE

BIOREN & CO., BANK, PHILADELPHIA
ARTHUR H. BROCKIE, ARCHITECT

COST AND CONSTRUCTION DATA

Type of Construction. Fireproof. Steel and concrete.
Exterior Materials. Sandstone and bronze.
Interior Materials. Marble floors and wainscot; rubber floors in working spaces. Plaster walls and ceiling.
Windows. Projecting type steel sash.
Counter Screens. American walnut.
Vault Provision. Concrete.
Type of Lighting. Concealed X-ray reflectors.
Heating and Ventilating. Vapor heat; oil burner. Forced exhaust ventilating.
Date of Contract. June 28, 1927.
Cubic Foot Cost. 69 cents.




PLAN, BIOREN & CO. BANK, PHILADELPHIA
ARTHUR H. BROCKIE, ARCHITECT

*Plans on Back*

ENTRANCE LOBBY



*Photos, E. L. Fowler*

GENERAL VIEW

FEDERAL RESERVE BANK, CLEVELAND

WALKER & WEEKS, ARCHITECTS

COST AND CONSTRUCTION DATA

Type of Construction. Steel and concrete.

Exterior Materials. Granite base and marble walls.

Interior Materials. Tennessee marble floors. Marble walls and piers.

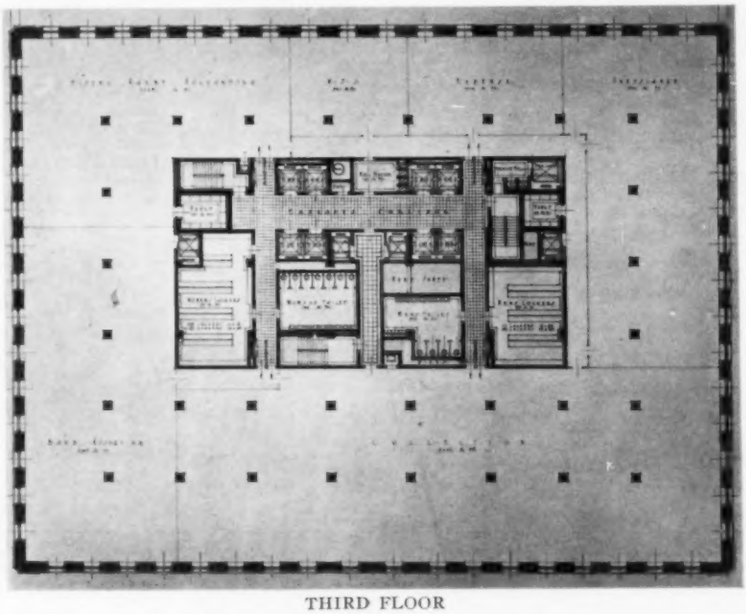
Windows. Covered with Swedish iron grilles.

Counter Screens. Marble counters with Swedish iron screens.

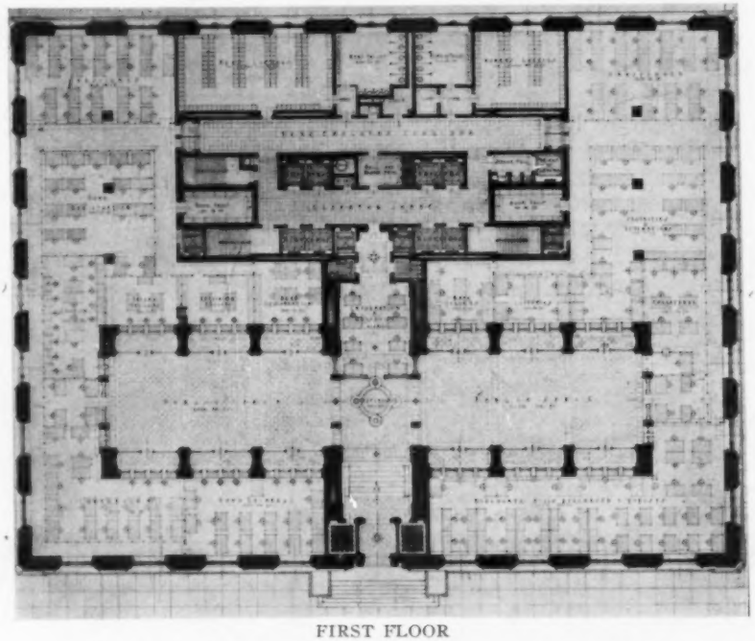
Vault and Safe Deposit Provision. Two-story vault of specially reinforced concrete.

Lighting. Furnished by independent power plant within the building.

Heating and Ventilating. Steam heat. A washed air, forced ventilation system changes the air from 6 to 15 times per hour.



THIRD FLOOR



FIRST FLOOR

PLANS, FEDERAL RESERVE BANK, CLEVELAND

WALKER & WEEKS, ARCHITECTS

# THE ARCHITECTURE OF BANKS

BY

FREDERIC C. HIRONS

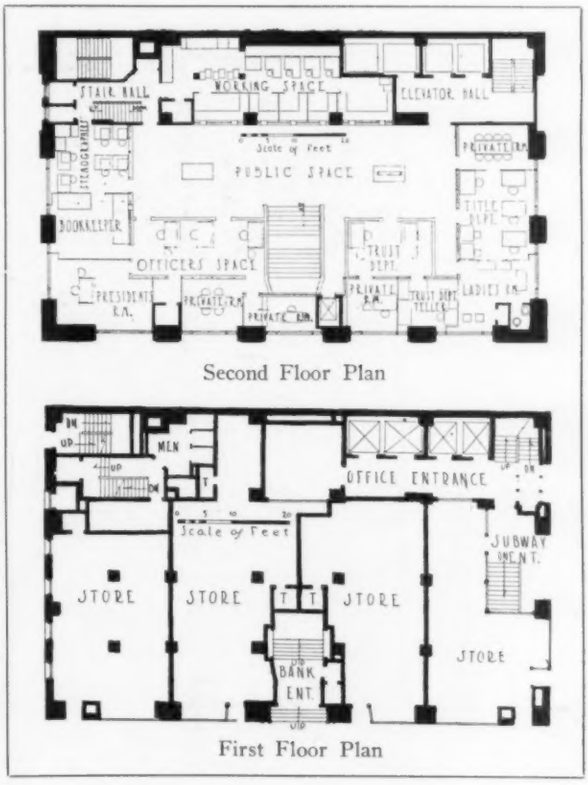
OF THE FIRM OF DENNISON & HIRONS, ARCHITECTS

THE designing of a banking institution in no way differs in principle from the designing of any other building. One must first of all get complete information from the operating officers concerning their needs and requirements, possible future growth, and the very vital point as to how much they wish to spend. To start the studies for a bank plan or layout, the architect should have this information, which should be supplied by the bank:

1. A survey with angles, dimensions and grades.
2. Number of the bank's employes.
3. Number of officers in public officers' space.
4. Number of private offices adjacent to officers' space.
5. Number of tellers' wickets desired for paying and receiving, and data as to whether tellers are both paying and receiving, or work separately.
6. Loans, discounts, notes, new business departments, etc., and number of tellers in each.
7. Number of bookkeepers.
8. Safe deposit department accommodations:
   (a) Number of boxes and sizes.
   (b) Number of coupon booths.
   (c) Number of committee rooms and sizes.

With this information at hand, the architect can study the plan, always keeping in mind the fact that the building is first of all to house a banking business, and that the practical needs and the architectural effect must be considered simultaneously. It will be a case of give and take in any problem, because the architect will naturally wish the building to be as architecturally attractive as possible, but he should realize that if a banker raises any objections to the design and gives excellent reasons from an administrative point of view for these objections, the artistic must give way to the practical. Keeping this important viewpoint in mind, he must endeavor to obtain the best architectural solution possible, because, for a building to be really fine, it should first of all answer every requirement for which it is built, which is obviously true of every utilitarian type of structure. A great deal of worry on the part of the bank officials and the architect could be avoided if, when they decide they are going to build, they would select their architect before they buy the property on which they wish to build, thus taking advantage of the architect's knowledge and training as to which piece of property would give them the best building. He could then study their problem

*Photo. William E. Fitzpatrick*




Second Floor Plan

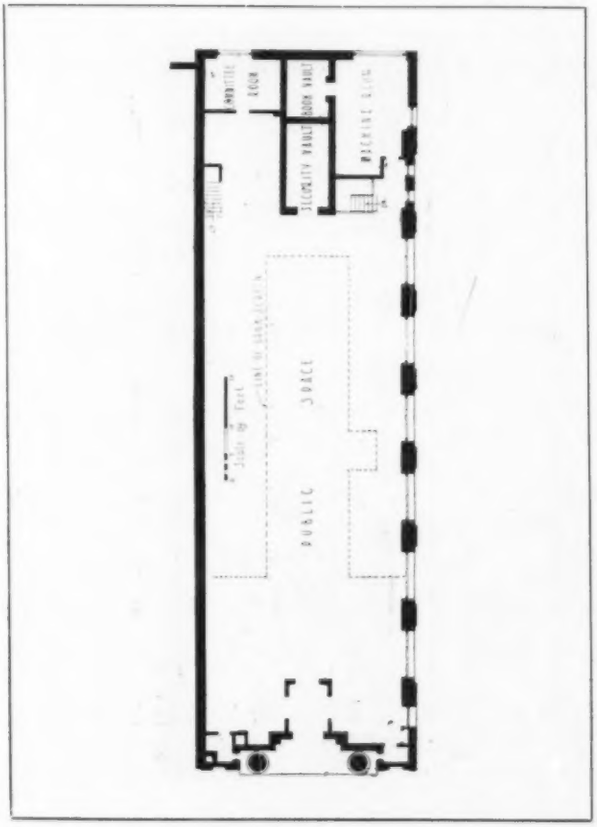
First Floor Plan

Liberty Title and Trust Co., Philadelphia
Dennison & Hirons, Architects


Front Elevation

Banking Room

Bethlehem National Bank, Bethlehem, Pa.
Dennison & Hirons, Architects




Main Floor

and be thoroughly familiar with their needs and possible future expansion, and could advise his clients as to which piece of land was more desirable for their purpose; but, unfortunately, this is seldom the case. The writer has in mind a banking institution that bought a piece of property and then selected an architect to design the building. When he had progressed to a certain point with his studies, he realized that the lot was only large enough for the bankers' immediate needs, so he advised them to buy, or at least to get options on some of the adjacent property. Unfortunately, this was not possible, and as a result this bank will within the next year or so have to get another lot and put up another and larger building. This short-sighted and expensive course could easily have been avoided.

No two problems are alike. There are numerous types of plans which will be suggested to the architect, but the four principal types one has to consider in planning any banking structure are:

1. Individual building on an interior lot.
2. Individual building on a corner lot.
3. Office building over bank, on an interior lot.
4. Office building over bank, on a corner lot.

In many intances any one of these conditions may be complicated by having to adapt the building to an irregular-shaped lot. In some cases, especially in large cities where land is very valuable, it is more economical to put stores on the ground floor, and the bank on the second floor above the street, which

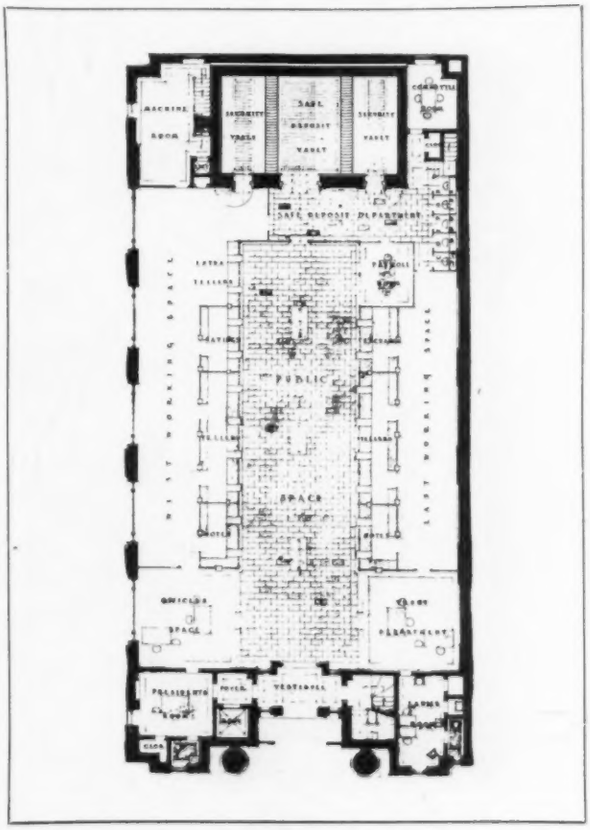
Public Space

Front Elevation

The First National Bank, Blairsville, Pa.
Dennison & Hirons, Architects

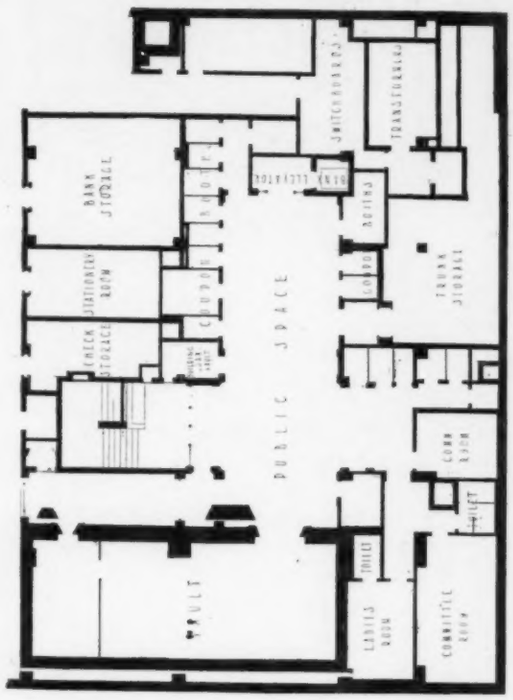
makes it necessary to provide a spacious and monumental entrance and stairway to lead to the banking room. This plan insures an appreciable source of revenue from the ground floor stores. In New York there are many examples of this arrangement. Good examples are the Bankers Trust Company, 42nd Street and Fifth Avenue, Montague Flagg, architect; the State Bank, 43rd Street and Eighth Avenue, Dennison & Hirons, architects; and the American Exchange Bank, Pershing Square Building, 42nd and Park Avenue, York & Sawyer, architects.

The designing of the Federal Trust Company in Newark involved the problem of placing a bank in an office building on an interior lot. This bank is on the ground floor with the main entrance to the bank opening from the entrance of the office building. Here the space for the officers' desks is located along the front wall. There is one decided advantage in this layout, inasmuch as it gives every officer, from his desk, an unobstructed view of the public space and every teller's wicket, so that if any special department is greatly rushed with business, it can readily be remedied by putting another teller in the department. In the study of this plan, the question of future expansion was of paramount importance, and the bank, having control of the building in the rear of the property, which extended through to another street, wished to secure a plan which would enable it to double its capacity at some future date. In Plan B on page 840, the present portion of the



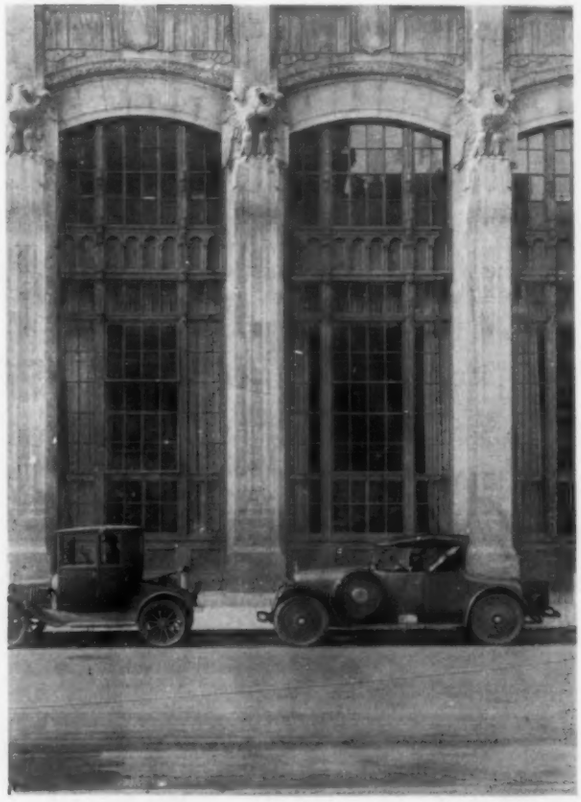

Main Floor Plan

GENERAL VIEW




PLAN, SAFE DEPOSIT DEPARTMENT

ENTRANCE DETAILS

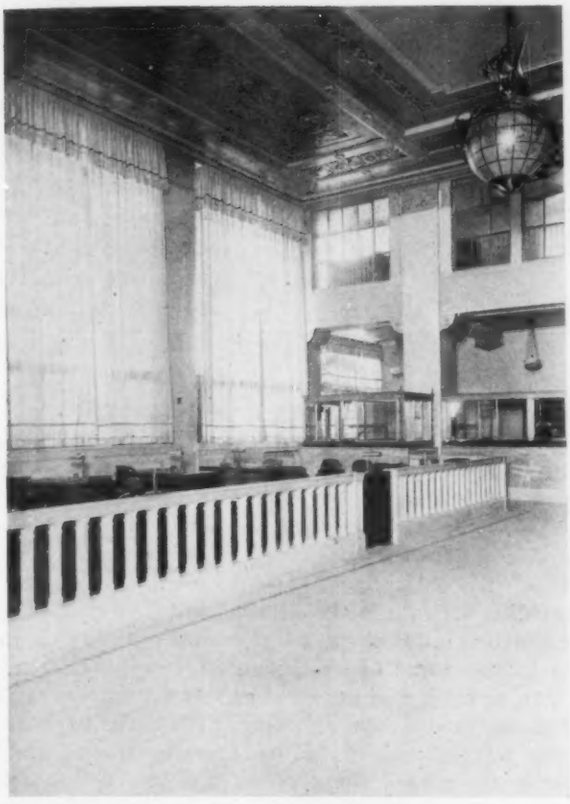


DETAIL OF WINDOWS

*Photos. John Wallace Gillies, Inc.*

THE FEDERAL TRUST CO., NEWARK

DENNISON & HIRONS, ARCHITECTS



CORNER OF BANKING ROOM

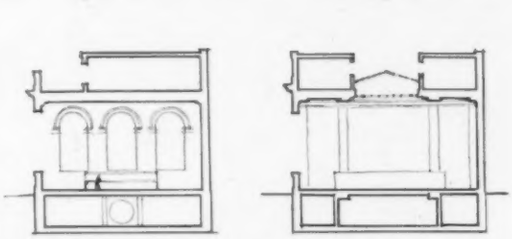
ENTRANCE TO SAFE DEPOSIT DEPARTMENT

WROUGHT IRON GATE IN SAFE DEPOSIT DEPARTMENT

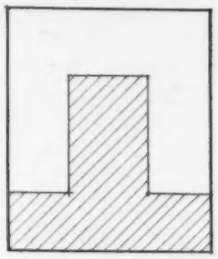
WROUGHT IRON GRILLE IN ENTRANCE LOBBY

THE FEDERAL TRUST CO., NEWARK

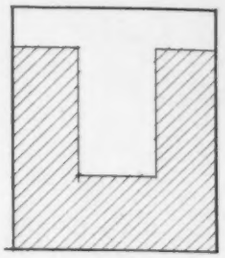
DENNISON & HIRONS, ARCHITECTS



Two Schemes for the Location of Special Departments Above the Main Banking Room



Horseshoe Type



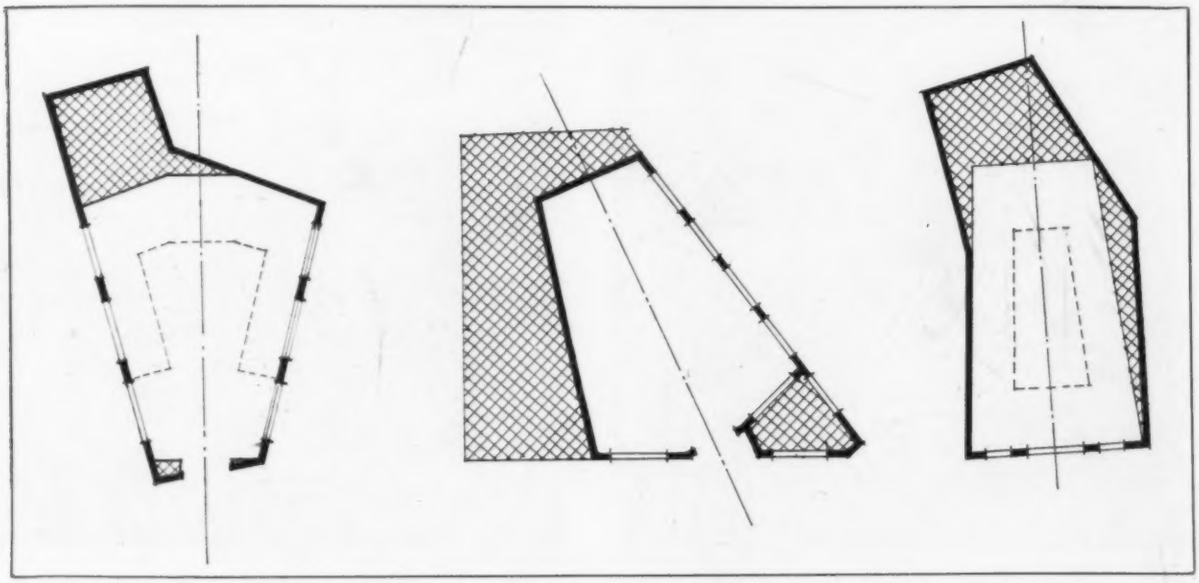
Island Type

building is shown in solid black, and the hatched portion of the future development. Plans A, B, and C on page 840 show the various schemes that were presented to and considered by the officers of the bank. In this instance the number of officers in the officers' space and the 26 or 30 tellers' wickets that were required, made it necessary to place the safe deposit department in the basement. This is generally true of all large metropolitan bank buildings, because the ground floor is decidedly too valuable to use for safe deposit business. Numerous schemes were tried for the layout of this department, but it was finally decided to place the stairs leading to it at the center of the public space, so that every officer from his desk can see who is going down. The plan of the safe deposit department is shown on page 836, and is a practical and simple layout for the banking business of this department. The plan makes possible excellent supervision, which is always highly desirable.

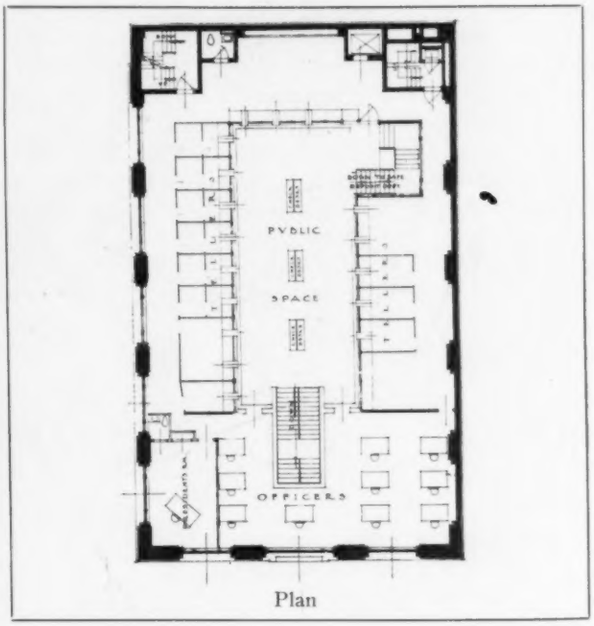
The Liberty Title and Trust Building, in Philadelphia, shown on page 833, is an example of an office building with the bank raised one floor above the level of the street, the ground floor being used for stores, which naturally yields considerable revenue and shows a better return on the money invested.

It is true that the architect must first thoroughly familiarize himself with the various requirements and needs of his clients, and then study the various possible schemes so that he will finally achieve a plan which is not only practical in the use of space and economical from an administrative point, but which will almost invariably give the best looking building from an architectural point of view. It is unfortunate that there are many concerns which go under the name of equipment engineers and architects, or bank engineers and architects. Such organizations usually have an experienced corps of salesmen whose business it is to secure contracts; when these are closed, the projects are turned into the office, where some draftsman is placed in charge of the plan and architectural design. It is regrettable that in 75 per cent of the smaller banks throughout the country, architects are chosen more on their ability as salesmen than on their ability as artists or master builders. The result being reflected in their work, which generally leaves much to be desired.

There are numerous details that must be borne in mind in designing the plan of the interior of a bank, and one of the most important is the shape of the



Three Schemes of Plan for Banks on Irregular Shaped Lots

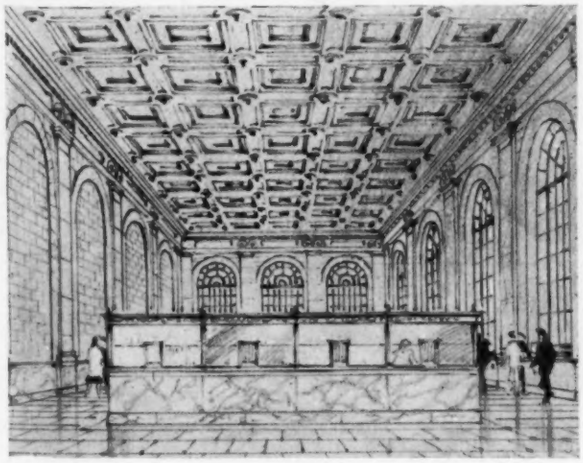




Plan

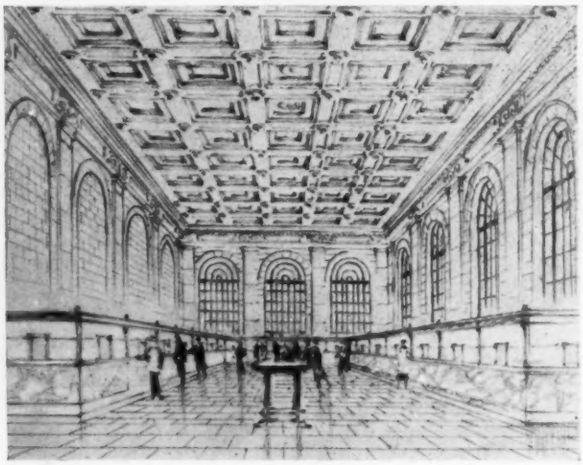
The State Bank & Trust Co., New York
Dennison & Hirons, Architects

public space,—whether it is to be of the "island" or the "horseshoe" type. National banks and trust companies are most partial to the horseshoe type, but savings banks will usually prefer the island type, because the working force is then more closely related, which is a vital point in the business of a savings bank. In the horseshoe plan, the various departments are much more flexible, and this plan more readily lends itself to expansion when the need arrives. As for the architectural effect, the horseshoe will give much finer results, as illustrated by two sketches shown on this page. The horseshoe plan gives a clear, unobstructed view of the room, whereas the island plan not only blocks a good view but, furthermore, has the disadvantage of splitting the public space in two parts. Another principle that the architect should be careful to consider, especially in medium-sized banks, is the question of acoustics. Circular, vaulted or domical ceilings are quite likely to act as sounding boards; this fact applies particularly to banking rooms of 30 feet or under in height. The architect, in designing and planning his building, must realize that he can go just so far in the general scheme and design, because the technical expert will have to consult with him many times after his sketches are finished, and there are always many structural details that affect the plan of a building and the method of its construction.

Sometimes an architect will find a banker who has very definite ideas as to what he wants, and the arrangements of his needs. This may make it difficult to obtain an architecturally successful bank. The best thing to do in a case of this kind is to make sketches of the scheme the client wishes, and to then make sketches of other schemes giving more possibilities from an architectural point of view, but at



Island Type



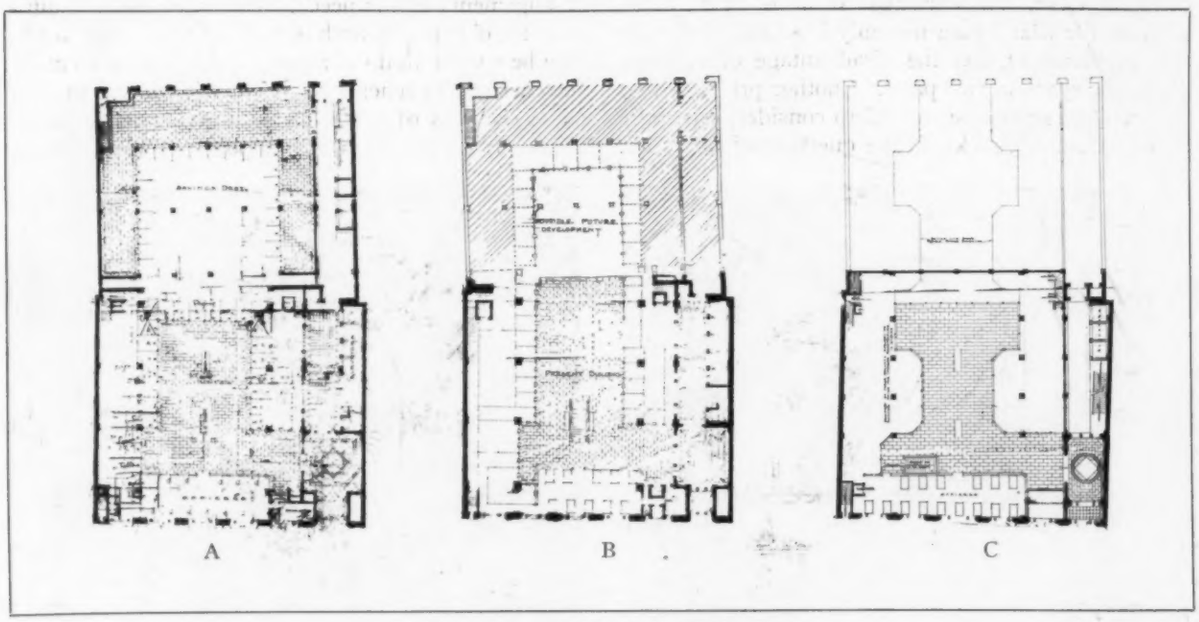
Horseshoe Type

Sketches Showing Two Types of Bank Layout

the same time embodying the requirements of the bank. The client will almost invariably realize the difference and be perfectly willing to be guided by the architect's ability to visualize his room and layout. In many cases where architects are called upon to design individual bank buildings, after the main banking room has been laid out with everything the banker demands on the ground floor, and with the safe deposit department, vaults, books and box storage, mechanical equipment, etc., taken care of in the basement, there still remain the bookkeeping, transit and mailing departments, clerks' locker rooms, toilets, etc., to be located somewhere. But the bank officials insist that the building shall have the appearance on the outside of a fine, large banking room. The writer recalls two instances of this, and the problem was solved as shown by two sketches which are shown at the top of page 838.

In the successful arrangement of all these necessary details and departments, great ingenuity is required on the architect's part. So the purpose of this article is to endeavor to show how the general plan and layout of the building may be determined by making sketches to a point where they shall receive the approval of the building committee, that the architects can make a close approximation as to what the costs, time of completion and materials are going to be. When the general plans and design of the building are approved, the next step is to prepare the working drawings, and if the building is the first bank structure the architect has designed, he will save himself much worry and many mistakes if he will confer with some of the engineers who make a specialty of banking equipment, vaults, electrical protection, etc. The day has gone by when the banker wants his building to look like a fortress, and as if it were impossible to get into, or to get out if one were in it. The modern building must be inviting and cheerful, and the evidences of strength and security must be shown where the securities are kept and in the safe deposit department. The officers' space should be out in the open part of the banking room, preferably adjacent to the main entrance, and in close proximity to at least the note and discount tellers. In country and smaller banks, the bookkeeping department is generally put in the rear of the tellers' cages; but where every square foot of area is valuable, as in the larger institutions, this can be placed on a floor or mezzanine above the main banking room. This causes no inconvenience whatever if there is an adequate installation of telautographs, intercommunicating telephones or pneumatic tubes, so there may be instant communication between the various departments. Mr. Sawyer, of the firm of York & Sawyer, in a most able article on the planning of banks in THE ARCHITECTURAL FORUM in June, 1923, illustrated a number of the largest banks in the country.

In addition to the conditions here briefly enumerated, there are numerous others which are bound to present themselves, especially in some of the smaller bank plans. The American banker demands the most efficient, up-to-date layout and equipment possible, and he certainly has every right to expect it. The American banking methods and system of doing business are without doubt the most efficient in the world. The primary purpose of a bank building is to properly house and take care of the existing work and requirements and provide for development in the future. Today, with the constant and various consolidations of banking institutions, it is more imperative than ever before to be sure that adequate provision is made to take care of this vital matter of future growth, certain to come to any vigorous bank.




Various Schemes Submitted for the Bank
Layout of The Federal Trust Co. Building, Newark
Dennison & Hirons, Architects

# THE FUNDAMENTALS OF BANK PLANNING

BY

ALFRED HOPKINS

OF THE FIRM OF HOPKINS & DENTZ, ARCHITECTS

BANKERS do not erect buildings without the advice of those whose business it is to prepare plans and specifications for them, but they do buy lots on which to build without the slightest knowledge of even the rudiments of bank planning. When the lot is purchased, certainly the limits of such important items as floor areas, light and ventilation, and the vital possibilities of expansion have been fixed. The architect cannot go beyond the confines established by that important individual, the city surveyor, who puts down his little arrows and makes his little markings and says: "Thus far shalt thou go, but no farther;" and here shall that great idea be stayed. In order to give some idea of the value and importance of lot areas, and some idea as to what sizes lend themselves best to bank buildings, it will be necessary to set forth a few elemental principles of bank planning. Indeed, all the details of the bank's requirements could well be determined by the lot's bounds and limits,—every one of them.

Now as to actual areas, I shall commence with minimums,—and how I hate them! They have no place in broad, consequential building. I believe more errors of judgment, business judgment and building judgment, result from the conservatism which hesitates to depart too far from the minimum than from any other one human frailty. If a man starts out to build a million-dollar building, he will be wise if he builds it in a million-dollar way. If he builds a hundred-thousand-dollar building, let him do it in a hundred-thousand-dollar way, but he should not proceed upon either adventure except upon the broad basis of the legitimate need of the structure involved. I remember a story told me by an old friend who was very fond of playing poker. But he always played for small limits. One day he got into a game with a high limit, found he was playing timidly and losing regularly. He said to himself: "I am not playing my game. I am thinking each time of the amount of every ante and what it costs me to draw cards. I'll forget all this and play the game as I am accustomed to play it." He did, and he won. And that is just the attitude to have toward building.

But to get back to our minimum again, no lot should be narrower than 40 feet for the type of bank shown in Fig. 8. This width allows a central public space of 18 feet, a width of 9 feet, 6 inches from the face of the counter to the back of the wall, and 3 feet for the thickness of the outside walls. But every additional foot in excess of this miserable minimum will be acclaimed by the bank's architect and its personnel. The wide lot has many advantages. Having for the moment established its minimum width, I shall refer to an important phase of bank design. This is the value and location of mezzanine floors. Their value in providing additional area is great, but they belong at the rear of the building and not at the front,—where the commercial architects have always put them. At the rear they are not only useful but they are indispensable, for work rooms, cloak rooms, file rooms, directors' rooms and the like. And the rear placement of the mezzanine leaves the front unobstructed, a vital requirement for modern banking. Consequently, every lot should have depth enough for well lighted mezzanine floors at the back. And interior lots, because they are more difficult to light, should be deeper than corner plots. The bank illustrated in Fig. 9, for instance, a normal example, required a depth of not less than 100 feet. This allows 12 feet for the width of the light court between the main banking room and the mezzanines at the back. A corner lot would permit mezzanines to be lighted on the side, so the space occupied by the light court required at the back of an interior lot is not so necessary. On this theory an interior lot, to provide the same relative floor area for mezzanines, should be at least 12 feet longer than a corner lot. One may think this an inconsequential point. It is not. It represents a difference of perhaps 12 to 15 per cent in the average lot length. Percentages are understood and appreciated by bankers. A 12 per cent yield, more or less, on a security is not inconsequential. An inch is not much, but put it on the end of a man's nose, and he will tell you it is a whole lot. It is the consideration of these seemingly inconsequential things which many times spells the difference between a partial and a pronounced success. From the foregoing, the minimum or miserly dimensions for interior lots would be 40 feet for width and 85 feet in depth.

But there is every advantage in having an increased width. Every foot added means another foot in the public space. Banks meet their certain growth by increasing the extent of their contact with the public. To do this, adequate area for the public is the first need. That is why width is important. The increased width at the front is advantageous; increased width at the back is sometimes equally so. Any possible broadening out of the lot area at the rear is extremely valuable. Assuming that there are three mezzanines, not an unusual number, rear lot areas may be doubled three times. The bank at Monessen, shown in Figs. 3 and 3A, has an extension at the rear which makes clear the value of additional width at that point. It must be possible to get light and ventilation, however, to make such areas useful, and it is the architect's function to plan for this. To emphasize the value of width of lot, let me briefly draw attention to another type of plan shown in

Commercial Trust Co., New Britain, Conn.

Fig. 1. Bank on a Steep, Sloping Site

Fig. 2 (New Britain). Both these plans provide an area at the side, which gives space for a low work room, or machine room at the main banking floor level, and allows both light and ventilation for the main banking room. This is interesting and convenient bank construction, but it requires a lot at least 50 feet wide. This is a minimum and a mean minimum; from 55 to 60 feet it should be. Every foot added to the width of this type of plan is doubly important, since it may be used to increase either the public space or the working area.

Another interesting possibility of a wide lot is that of future expansion. In Fig. 8, showing the minimum width of 40 feet, the only way the screened area can be increased is by extending it back, sometimes an awkward alternative. If the lot were 18 feet wider (58 feet), the screen could be extended as shown in Fig. 10. This is called a "single expansion of the screen." If the lot were 35 feet wider (75 feet), a double expansion could be made, as in the bank at Trenton (Fig. 11). This rearrangement is very easily accomplished if the screen is built for it at the start. The difficulty of future expansion is never in constructing a screen so that it may be easily changed; it is always in the lack of floor area in which to expand it. All the foregoing has been written with the plan shown in Fig. 8 as a basis; that is, a central public space with the screen running down each side;—the "horseshoe" or "U" plan, so called. In lots narrower than 40 feet, particularly where fewer wickets will be required, the single screen is the only possible solution. This arrangement is particularly adapted to the smaller bank, and when carried out in connection with the machine room as shown in the bank at Homestead (Fig. 4), it is eminently satisfactory.

So much for confines; now for contours. The level site is usual and, as a general thing, it makes comfortable designing for the architect and simplifies this problem for the banker and his clients; but sometimes there is a stiff difference in levels which has to be reckoned with. My memories of the great Keystone state, also a great bank building state, are very vivid as to levels. Here the flat site is so rare that I think it is almost safe to say that one does not exist. When the lot, rising sharply toward the back, pushes the building into a hill, it creates perhaps, the most awkward condition possible. But being an optimist, I can see good even in this, for the gradual elevation of the sidewalk permits the man in the street to get a better view of the bank's interior, which all bankers want. The rise of the sidewalk against the outside wall, therefore, provides a practical advertising advantage, but the difficulty is to take full advantage of it without sacrificing the architecture. Many designers frankly give the problem up and declare it to be impossible. But, personally, I have always been unwilling to admit defeat, for I think the architect should, and can, meet every practical requirement and still create a fine architectural effect. Fig 1 shows a solution of such a problem, which I believe to be successful, and, as I recall it, there was a difference between front and rear levels of some 10 or 12 feet. Where the lot falls away at the back, the architectural problem is much simpler. In fact to such a site there are distinct advantages, since a basement entirely or even half above ground secures better light and ventilation to the several departments which are frequently better below than on the main floor. A drop in the rear of the lot once made it possible to gain easy access to the basement of a large bank and office building. A garage for the storage of 100 cars was put there, and this convenience did more than any other one thing to rent quickly, in a city already overbuilt in office space, the hundred odd offices above. The garage paid for itself many times over.

But as I have already observed, architects are not often consulted in the selection of sites, though the importance of the site is paramount. I may say, that seldom does an important real estate transaction go through in one of the great cities until the prospective owner knows exactly what kind of a building he can put upon the property he proposes to buy;—

Commercial Trust Co., New Britain, Conn.

Fig. 3. First National Bank & Trust Co., Monessen, Pa.

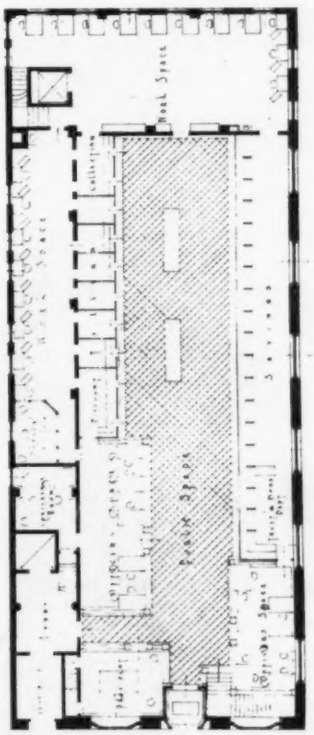



Fig. 2. Commercial Trust Co., New Britain, Conn.

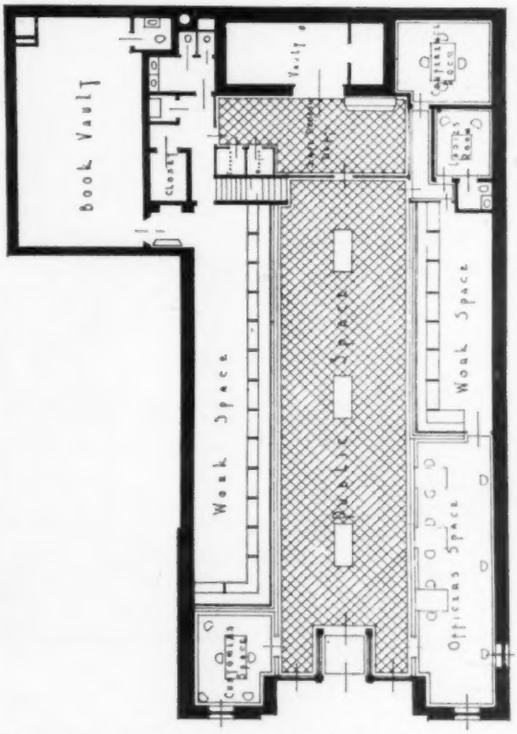



Fig. 3A. Plan, First National Bank & Trust Co., Monessen, Pa.

Interior Facing Entrance

Banking Room

Commercial Trust Co., New Britain, Conn.

and he wants this information *before* his purchase and not *after* it. If two sites are available and under consideration, then is the time to select one's architect and try out the advantages or disadvantages of each by the comparison of careful planning; in this way only will it be possible to determine definitely their relative values. It sometimes happens that the main consideration in a choice between two properties has to do with the cost involved, rather than with their respective suitability as building sites. Here is the story of a banker whom I found in just such a dilemma. Several years ago I called on him with respect to a new building. I found him huddled up in his old quarters, in great confusion, and with everybody on top of everybody else. He had taken over an old store as an annex, and a screen knocked together out of sheathing and window glass housed his trust and savings departments. He wanted to build, but of two sites available he could not tell which he preferred or could better afford. Though I wanted very much to do so, I did not tell him the story of the celebrated jackass that died of starvation between two bundles of hay because he did not know which one to eat. Nor did I undertake to tell him which was the better site, because he intimated that that was a matter no one but himself could decide. So I departed, leaving him to formulate his own conclusion. Not so long ago, but two years after my first visit, I was passing through his town (in western Pennsylvania) and stopped off to see him. Same old place, same old confusion, same old system of everybody on top of everybody else. But he remembered my previous call pleasantly, greeted me cheerily, and when I wanted to know how the new bank building was getting on, he said it wasn't getting on at all. He still had to decide where he was going to build; whether he would stay on his present corner or move across the street. Again, I wanted to tell him the story of the jackass, and came to the very verge of it, but refrained. We were soon out

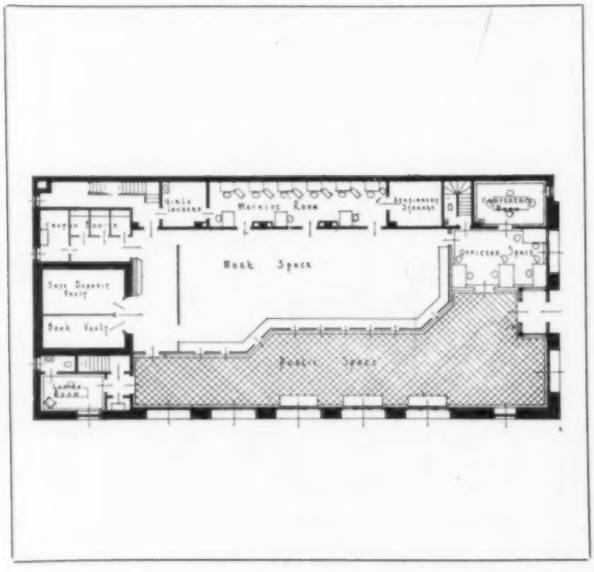



Fig. 4. Plan, First National Bank, Homestead, Pa.

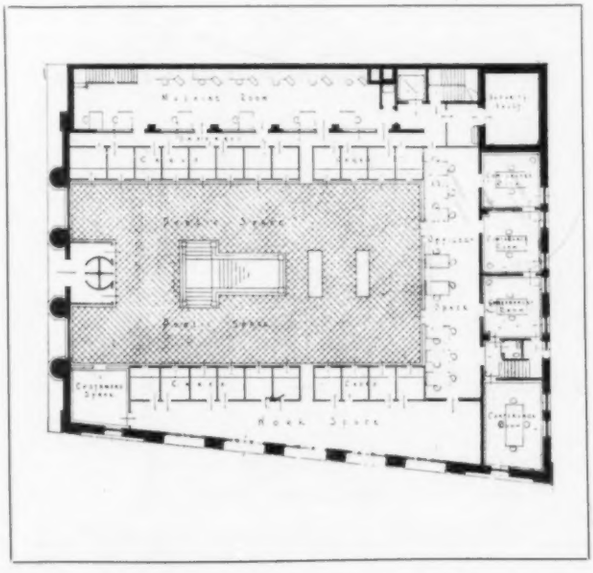
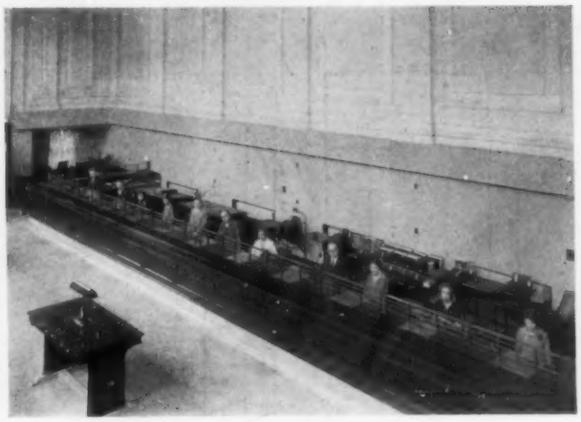



Fig. 5. Plan, Monongahela Trust Co., Homestead, Pa.

Dime Savings Bank, Akron, O.



First National Bank, Monessen, Pa.

upon the street, however, going over the two properties. There was no doubt as to which was the better, nor was there any doubt as to which would cost the more. So I said to him, "The crux of this whole matter is, how much more you are willing to pay for the best place to have a bank." I thereupon ventured the opinion that $50,000 would not be too great a sum. "Is not a bank on this corner worth $3,000 a year to you?" I asked, for by this time we were standing before it. He replied instantly, "It seems to me $3,000 a year is very little to pay to have a big billboard on the best corner in town. A bank is only a billboard, isn't it?" "That's just what it is," I replied. "A bank building is advertising,—the best kind of advertising. And speaking of advertising," I said, "how much do you spend?" "$12,000 a year." "How?" "Billboards and newspapers." "Well," said I, "here's another point of view. If you wanted to concentrate half your present advertising budget on the 'best corner in town,' you could pay $100,000 more for that corner, and not have your advertising cost more than it does now, and would not advertising on the best corner in town, as you propose to do it by a new building, be worth a good half of all the advertising you are now doing?" Bankers being conservative, he did not commit himself. So I went on. "I know by spending $100,000 more, you are mortgaged for $6,000 interest a year forever. But! You have already been on this corner for 20 years, and you are going to be here for 20 years more. Please think how much smaller a similar $6,000 expended 20 years ago would look to you now than it did then. During 20 years this same $6,000 we are now discussing will dwindle with each passing year. I can promise you that when you see a real bank building on that corner and find yourself doing business in it, you will feel this $6,000 to be the best advertising you have ever done." Bankers being conservative, we did not then decide the matter. But after I had drawn a

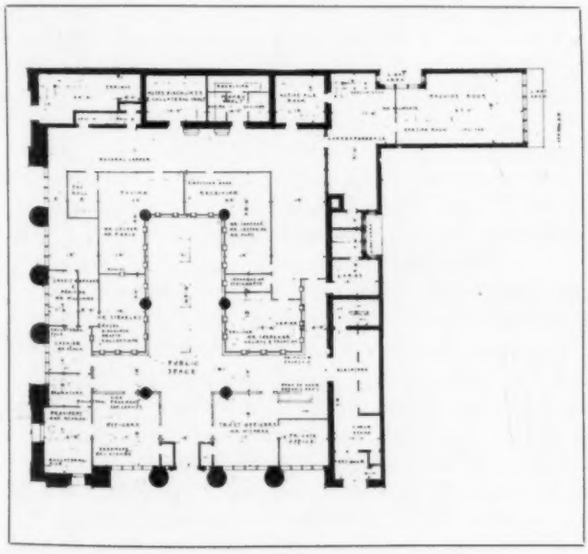


Fig. 6. Plan "A"; 27 Wickets

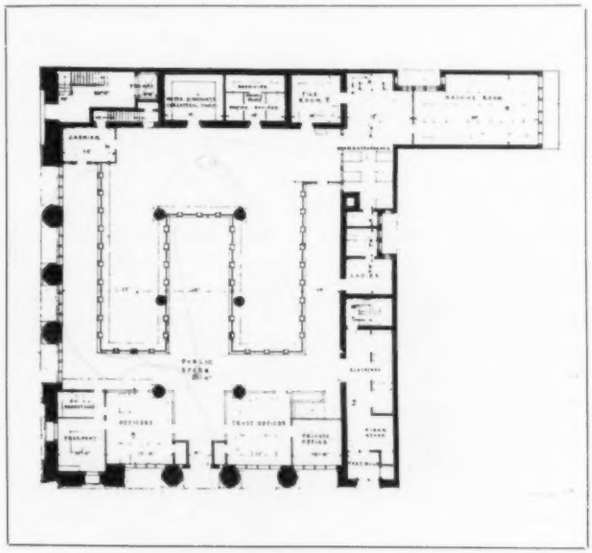


Fig. 7. Plan "B"; 42 Wickets

Plans of an Actual Project, Plan "A," to Be Built at Present, and Plan "B," Providing 15 Wickets for Future Expansion

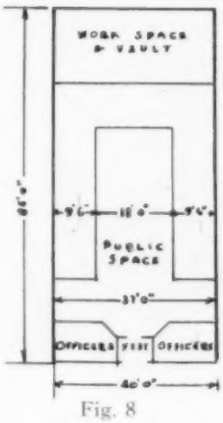


Fig. 8

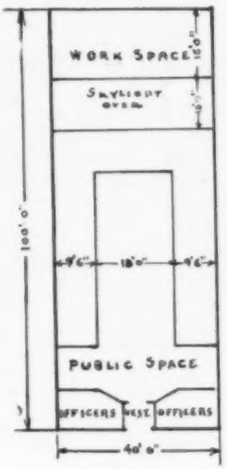


Fig. 9

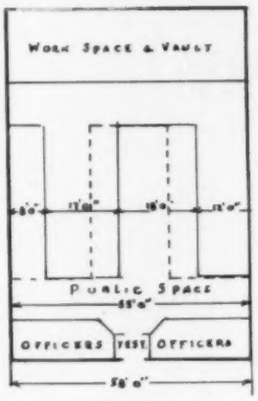


Fig. 10

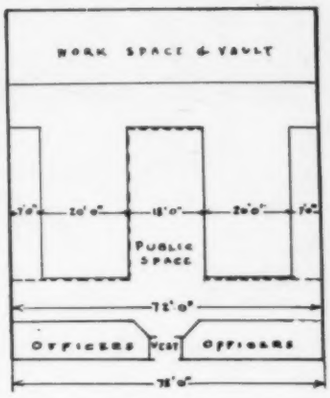


Fig. 11

Plans Showing Minimum Sizes of Banks on Interior Lots Solid Lines Show Future Expansion of Screens

further picture of what might be built "on the best corner in town," we went to look once more at the other corner, and we found it looking like nothing at all. But we had made progress toward a real decision, my banker friend and I. And I know exactly how the matter is coming out and said so; but he, being a banker, and more conservative, did not commit himself. In the meantime I am wondering just how and when and where I am going to tell him that story about the jackass!

And right here I want to say how very important a good location for a bank is. I am sure every banker realizes that quite as much as I do, but every once in a while I see a bank in an out of the way place, struggling along on a poorly situated corner, and my heart goes out to those who are working so conscientiously under a needless handicap,—having no happy place in the sun. So I am stressing how vital is that place, and how necessary it is for the banker to screw his courage up to the sticking point and pay the price to get it. A successful banker exclaimed to me once: "What has a bank to sell except service!" A convenient location for its clientele is just as much "service" as any other accommodation, which the bank is glad to provide. The bank long ago found out the value of the golden rule as a means of securing business; that the best location for its customers is the best location for itself. In fact, with respect to location, I have never heard higher optimism expressed or a keener appreciation of what a good site will do in the way of increasing business than that uttered by my recent friend with his breezy phrase: "A big billboard on the best corner in town."

Selecting the type of plan best suited for individual requirements is always interesting, and it becomes more and more so to those who have studied and continue to study the problem of bank design. Over a long period of years I have watched with keen interest the banker's approach and criticism of the various forms of bank plan the architect has devised for him. For, after all, it is to the opinions of those who use what he has planned that the architect must look for a final judgment.

Bankers are now entirely conversant with the "island" plan and the "horseshoe" or "U" plan—(both illustrated on page 838). The latter plan has stood the test of time and stood it well;—the screen on each side, and the great vault door in the center, where everyone can see it. This arrangement has the advantage of symmetry, certainly. But the vault is found very much in the way when it comes time to enlarge it, and its location here interrupts the communication between departments behind the screen. But the U-plan has many advantages. It focuses the attention of the bank's personnel upon the public when it may better direct it and serve it. In the U-plan there is not only a certain sense of safety but a practical advantage in security, for anyone attempting a holdup would have to start that precarious performance in a position which would permit the bank's force to take him upon both flanks at once. I have no doubt that this fact has deterred many a holdup man from practicing his trade in banks with the U-plan. With these practical advantages to its credit, the U-plan has also a fair edge over every other variety of plan in its sightliness. It obstructs the view less;—in fact it obstructs it not at all. Patrons, on entering, see at once the entire length of the bank's interior.

I remember once talking with members of a building committee who were plying me with questions at

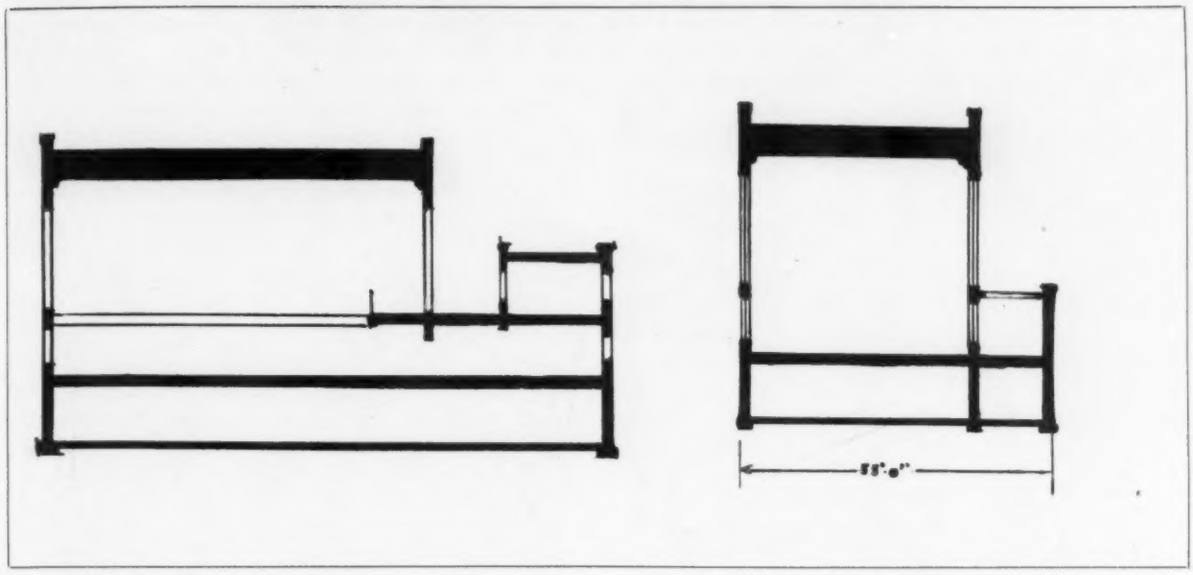


Fig. 9A

Longitudinal Section Through Plan Shown in Fig. 9 with Light Court at Rear

Fig. 2A

Cross Section Showing Light Court at Side Next to Adjoining Property. For Plan See Fig. 2

a great rate. I was negotiating for the work, and they were giving me every kind of a test but a blood test. There came a lull in the examination, which had been severe, and which had left me dazed and breathless. Quite unexpectedly, the chairman came suddenly to life and, gathering himself up, he looked me squarely in the eye and said, with an "I've-got-you-now" tone in his voice: "Mr. Hopkins! How wide should a public space be?" "18 feet is a very decent minimum; 20 feet is comfortable; 22 feet is excellent; and 24 feet perfect," I replied. And I said it with such promptness and decision that the utterance surprised both of us. It was a good enough answer, and he never forgot it,—for it came up to pester me at many subsequent meetings. But I stuck to my rule, which resulted finally in the purchase of the next lot, when we were able to have a public space of 26 feet in width. The public space shown in the fine room of the Monongahela Trust Co., Homestead, Pa. (Fig. 5) is 40 feet in width. There is nothing like a broad public area, especially for a large bank.

The width occupied by the counter and the cages all depends upon circumstances, principally the circumstance of the width of the lot and how much the banker wants to bank. I have given 9 feet, 6 inches as a minimum. This allows 2 feet, 6 inches for the counter, 4 feet for the depth of the cage, and 3 feet for the passage behind it. If rear counters are desired, then 2 feet must be added to the depth of the cage, making it 11 feet, 6 inches from the front of the counter to the wall. In Fig. 2, the passageway behind the tellers' cages has been omitted. The cages enter directly into the work room, a system of planning which adds 3 feet of usable public space the entire length of the screen;—no inconsiderable amount, as every banker and architect well know.

But I will let the details of planning go until a later chapter, and we will leave the U-plan at this point and turn to another variety,—the "island" plan. The island plan is certainly convenient for the bank,—there is no question about that,—but it is inconvenient for the public. Customers are obliged to wander around a circumference looking for various holes in the screen through which they may do business; and incidentally, we are told that when the human mind has lost the sense of direction it causes the body to travel in circles. Why start the body on a circuit, which if persisted in may very soon affect the mind? The island plan was devised during that lamented period, now long since past, in which the "public-be-damned" spirit crept a little way into even the staid, conciliatory soul of the banker, and made him think more of his own convenience than of that of his clientele. That type of plan seems now to have gone with the spirit of its day, and the "half-island" plan (Fig. 4) has taken its place. For the smaller institution, especially, and in many cases the larger bank as well, this type has a great advantage. There is no interruption in the communication between departments on the bank's side, and there is no difficulty either in the convenience or in the control of the public on the public's side. With qualifications, it has none of the disadvantages of either the U-plan or the island plan, and it possesses the advantages of both.

There is still another type,—or arrangement,—that one sometimes finds in the larger institutions, and that is an island space for the officers, the screen being placed around them on all sides. I have always felt that this herding of the officers into a central bull pen was undignified, and is certainly lacking not only in actual privacy, but in every seeming indication of it. And this brings up an im-

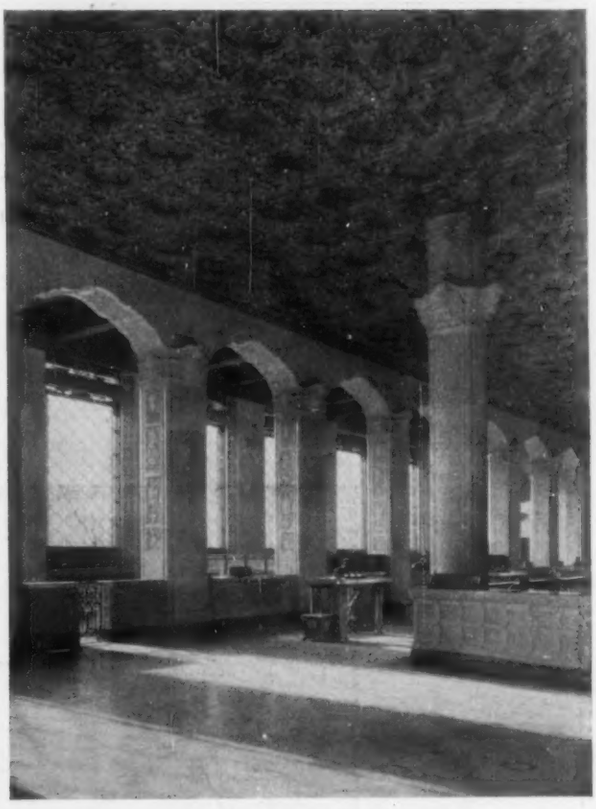
portant and a frequently debated detail,—where should the officers be located? It is interesting to note the change in attitude of those estimable gentlemen as to just where is the most suitable and convenient place for having their contacts with the public. In the old days, the bank president received his callers in seclusion at a remote corner in his institution. Latterly, the thought has been to give him and the other officers a position of the utmost prominence, actually as near the front door as is possible. I have even heard the president of a near-billion-dollar institution say that he could get through more work in a day out in the open than he ever could in his old private office. And he gave several very convincing reasons just why this was so. This opinion has been generally held throughout the last decade. But putting the officers at the front entrance, while "humanizing the bank," as we used to say, makes the officers sometimes entirely too accessible. It is true that here they may greet the old customer and welcome the new, but these hospitable and agreeable civilities, and others incident thereto, frequently take more time and cause more interruption to actual business than they are worth.

Let us commence by considering the convenience of the greatest number of the bank's clients. Do more consult the officers, or do more deal directly with the tellers? Certainly the latter condition obtains in every instance. Then put the screen to the very front, so that the bulk of the traffic may come in, transact its business as speedily as may be, and go out. Keep the in-and-out customers as near the entrance as possible. This is sound logic and good banking. The plan shown in Fig. 5 was designed upon this theory. With the front taken up by routine business, the best place left for the officers is at the end of the public space, certainly a convenient and dignified position. Well lighted private offices adjoin. And one great advantage of putting the officers at the back is the ease and convenience with which private offices may be provided for them, though only where there is natural light at this point. The private office is always difficult to manage if placed forward. Either a front window has to be taken for it, or else it must be incorporated in the screen. This can be done conveniently enough with the present high screen, but if I can foretell the future in bank design with any degree of accuracy, the high screen will eventually be discarded in favor of the low counter. Then the already difficult task of providing suitable private offices at the front of the banking room will be made more difficult still.

A type of structure which gives naturally a place for private offices at the front is that shown in Fig. 2. I have already referred to this elsewhere, but I do so again because it is a type which I have developed, and every parent is entitled to be a little foolish about his favorite child. A bank building constructed upon this plan has distinct advantages. It gives light and ventilation at a usually dark, unventilated side; it provides an enclosed machine room at the most convenient point, directly behind the tellers; it leaves a natural place for a private office at the front, and it does all this without losing a foot of the lot's area. Then it does something else. It provides an area outside of the main banking room which may be divided into low mezzanines, very suitable for additional private offices or consultation rooms. Or, if these are not wanted, the space may be used for storing inactive files or for any of the purposes which the basement is usually put to. The cellarage is always the least desirable floor area, and one of the first requisites of bank building is the development of mezzanine floors which will take out of it the locker rooms, file rooms, etc. formerly put there. But this system of planning decreases the width of the main banking room, and I occasionally have someone overrule me on this account. But it is unwise judgment. Narrow rooms are always dignified, and there is no reason to object to such proportions on æsthetic grounds. Besides, there is less cubic content to heat and to pay for; less wall to construct, to decorate and to clean; and these are all tangible economies.

And now with several varieties of plans set forth, which should be chosen? That choice is not always left to the architect. The banker generally has a pretty clear idea of the kind of bank he wants to do business in. The old adage which declares that what is one man's meat is another man's poison is applicable to many things besides his food! It is even applicable to bank plans. I was once greeted with the positive assertion, by a highly respected and irascible banking brother, that he could plan a better bank than any architect, and he did,—and I built it;—which is another story, and a good one. But when I have my way, I suggest for the smaller institution, a plan on the lines of Fig. 4,—the half-island plan. It provides the maximum convenience for the bank and everything necessary for the public. It does not lend itself to expansion, to be sure, and so it must be conceived at the start on an adequate scale. But for every other requirement it is excellent, and for the smaller bank I doubt whether it is possible to develop the structure further except in detail. For the large, growing and important institution, Fig. 2 shows an excellent type. It provides every present convenience and every possibility of future expansion within a given lot area. The value of the form of its structure I have already noted. Its suitability for the busy bank I shall now briefly recapitulate. The double screen gives the maximum opportunity of contact with the public,—the savings bank on one side, with the commercial bank, adjoining the machine room, on the other. With two mezzanines at the rear there is an excellent floor area provided for future expansion;—floor area that may be utilized either for additional officers' space or for the clerical force. But this plan should be developed upon a corner lot at least 55 feet wide and 115 feet deep. With this lot area, here is the perfect plan for the active, constructive, expanding institution.

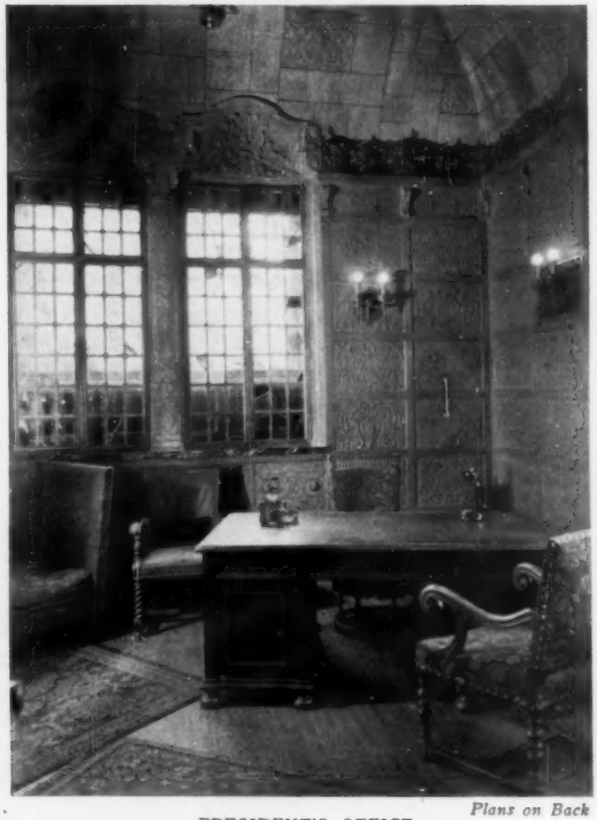
GENERAL VIEW



MAIN BANKING ROOM

*Photos. Mott Studios*

CORNER OF MAIN LOBBY



PRESIDENT'S OFFICE

*Plans on Back*

THE PACIFIC NATIONAL BANK, LOS ANGELES

MORGAN, WALLS & CLEMENTS, ARCHITECTS

COST AND CONSTRUCTION DATA

Type of Construction: Skeleton steel and concrete slab construction; hollow tile partitions.

Exterior Materials: Brick and terra cotta, with granite base.

Interior Materials: Marble floors; imitation travertine walls.

Windows: Double; plate glass.

Counter Screens: Cast travertine.

Vault and Safe Deposit Provision: Reinforced concrete vaults.

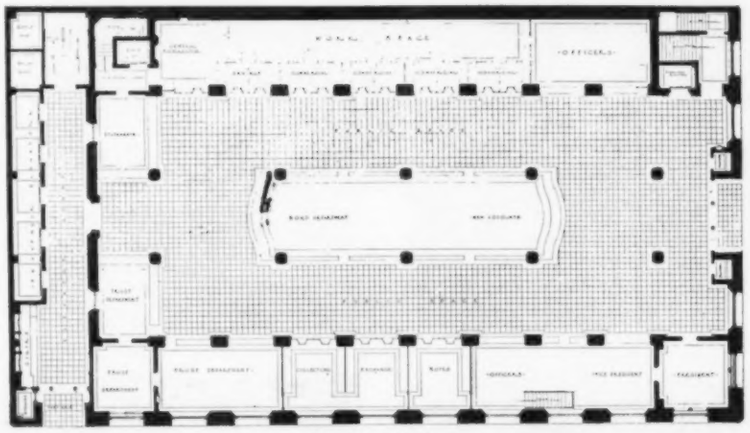
Type of Lighting: Indirect.

Heating and Ventilating: Steam heat and washed air ventilation.

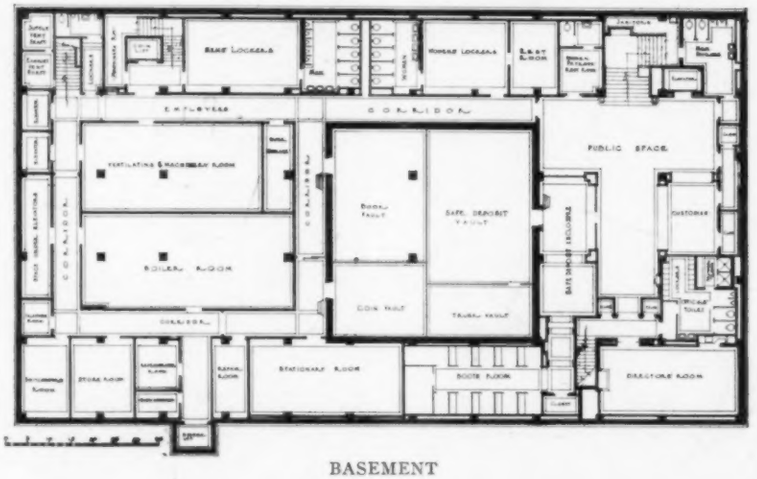
Date of Contract: April, 1925.

Total Cost of Building: $1,445,000.

Cubic Foot Cost: 58 cents.



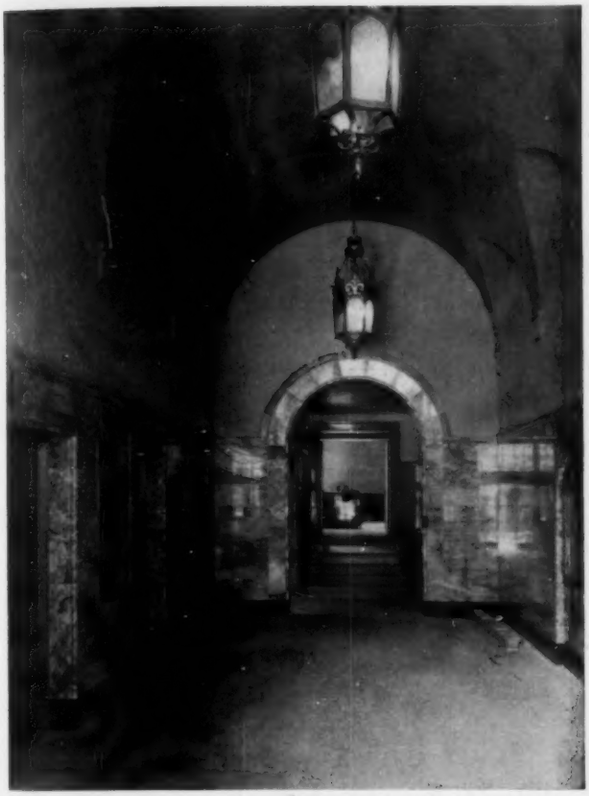
FIRST FLOOR




BASEMENT

PLANS, THE PACIFIC NATIONAL BANK, LOS ANGELES

MORGAN, WALLS & CLEMENTS, ARCHITECTS

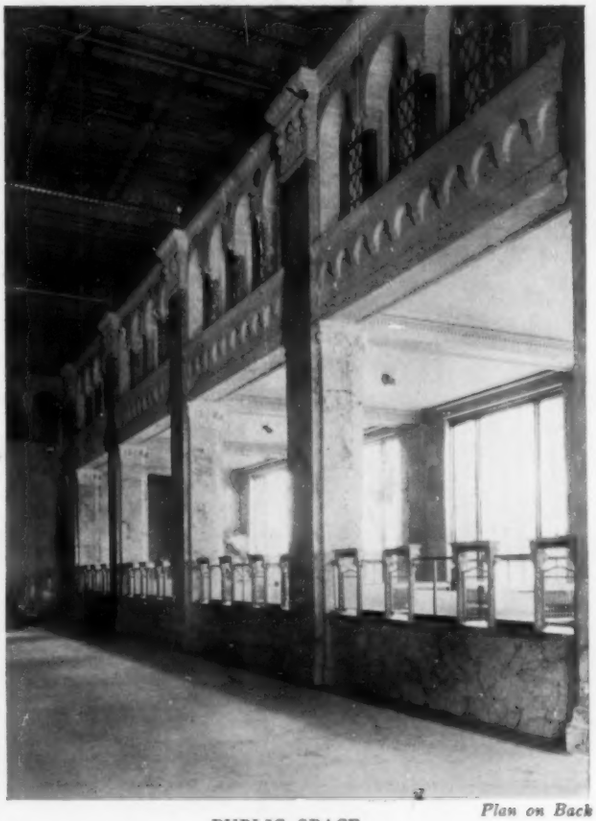


ELEVATOR LOBBY

GENERAL VIEW

*Photos. Herbert R. Fitch*

BANKING ROOM



PUBLIC SPACE

*Plan on Back*

SAN DIEGO TRUST & SAVINGS BANK

WILLIAM TEMPLETON JOHNSON, ARCHITECT

COST AND CONSTRUCTION DATA

Type of Construction: Steel frame.

Exterior Materials: First two stories sandstone; remainder, terra cotta.

Interior Materials. Marble, bronze, cast stone and iron.

Windows: Plate glass with metal frames and sash.

Counter Screens: Marble, with bronze and plate glass.

Vault and Safe Deposit Provision: Security and storage vaults with up-to-date standard equipment.

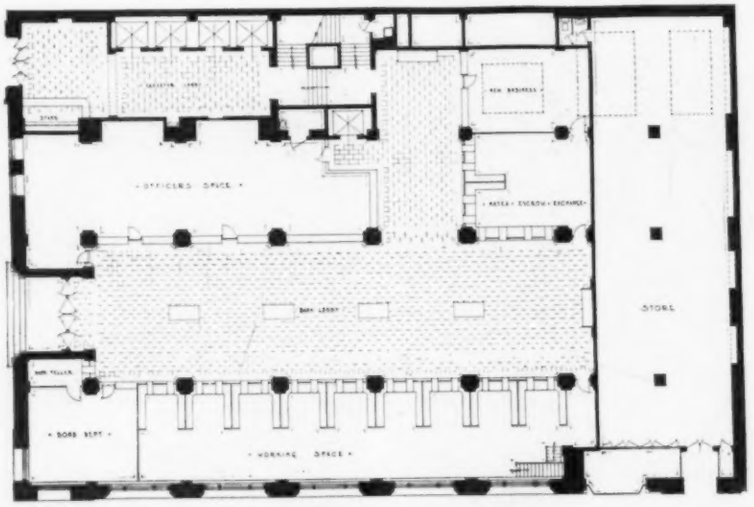
Type of Lighting: Especially designed.

Heating and Ventilating: Direct steam heat, with a complete system of ventilation.

Date of Contract: March, 1927.

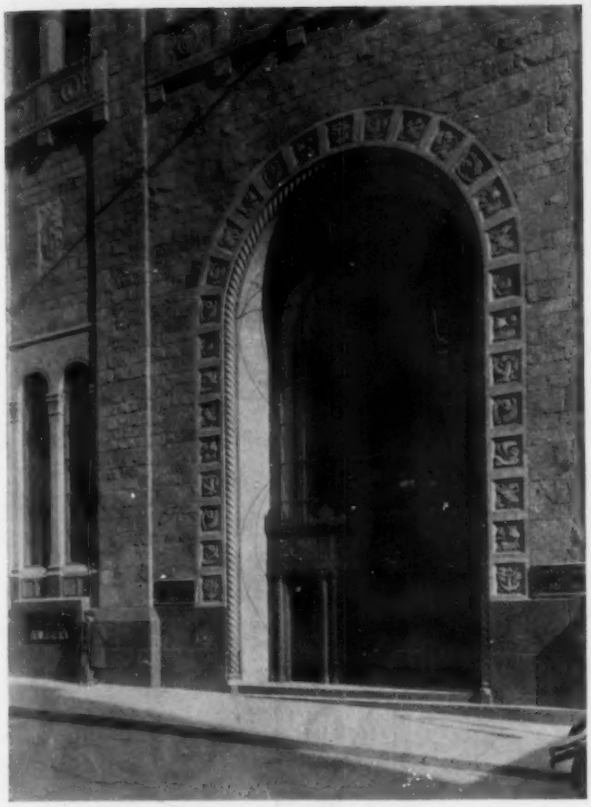
Total Building Cost: $1,400,000, exclusive of banking equipment.

Cubic Foot Cost: 59.4 cents.

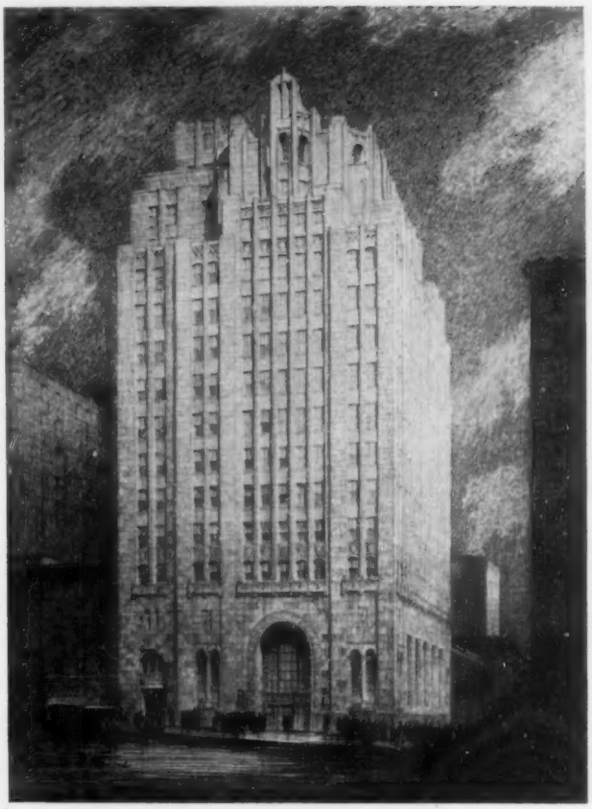



PLAN, SAN DIEGO TRUST & SAVINGS BANK

WILLIAM TEMPLETON JOHNSON, ARCHITECT



MAIN ENTRANCE



PERSPECTIVE

PUBLIC SPACE AND SCREEN

PART OF BANKING ROOM

*Plan on Back*

SEAMEN'S BANK FOR SAVINGS, NEW YORK

BENJAMIN WISTAR MORRIS, ARCHITECT

## COST AND CONSTRUCTION DATA

Type of Construction: Steel; short-span cinder concrete arches.

Interior Materials: Stone, marble, wrought iron; bronze; plaster and wood.

Exterior Materials: Granite; cast stone; marble and brick.

Windows: Steel.

Counter Screen: Marble and wrought iron.

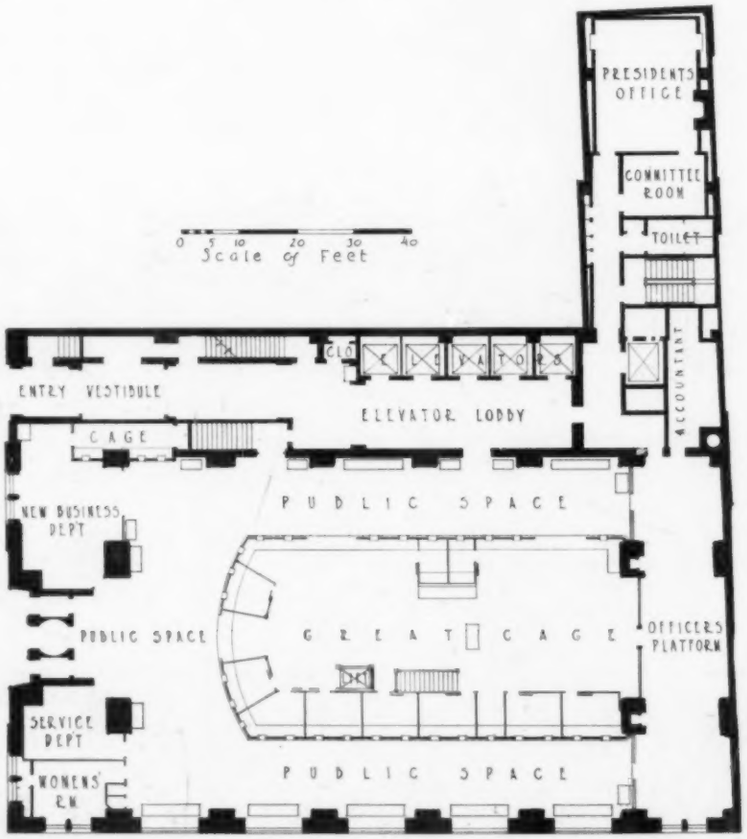
Vault and Safe Deposit Provision: Security and safe deposit vaults.

Type of Lighting: Direct and semi-direct.

Heating and Ventilating: Steam heat; exhaust ventilation.

Date of Contract: December 21, 1925.

Cubic Foot Cost: 89.5 cents, based on cost including vaults, but exclusive of tenant alterations and architect's and engineer's fees.




PLAN, SEAMEN'S BANK FOR SAVINGS, NEW YORK
BENJAMIN WISTAR MORRIS, ARCHITECT

GENERAL VIEW


MAIN FACADE

*Photos. Thomas Ellison*

*Plan on Back*

BANKING ROOM

SECOND NATIONAL BANK, SAGINAW, MICH.

SMITH, HINCHMAN & GRYLLS, ARCHITECTS

CONSTRUCTION DATA

Type of Construction: Concrete foundations; steel frame; concrete fireproofing and floor slabs; brick curtain walls.

Exterior Materials: Granite base; lower stories limestone; upper stories face brick; terra cotta trimming.

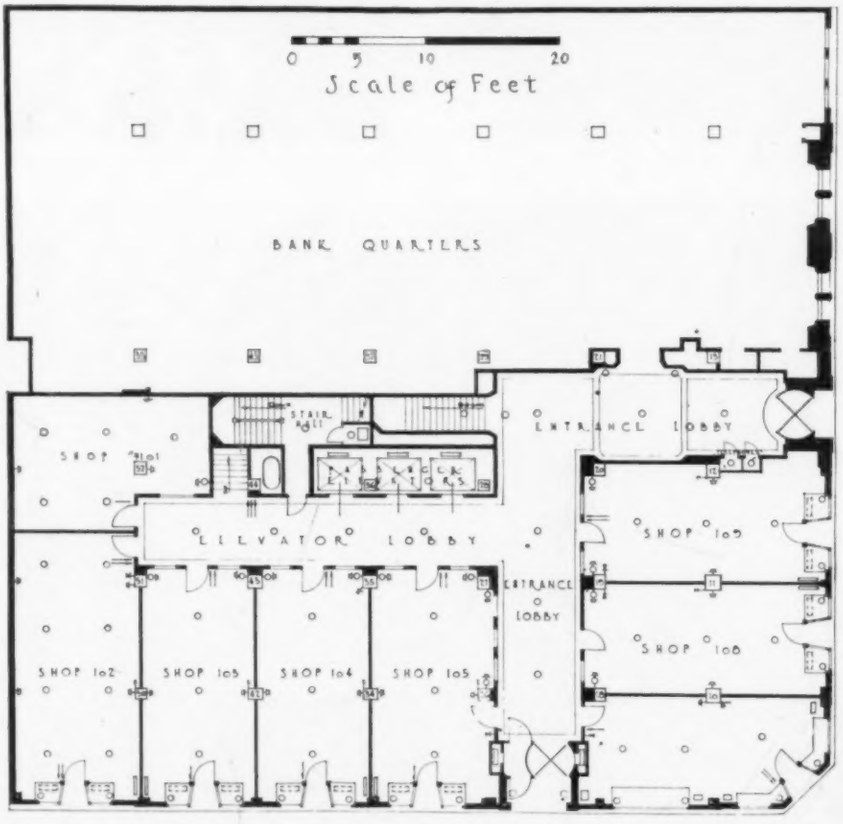
Interior Materials: Marble floors and wainscots.

Windows: Ornamental cast iron in street fronts.

Counter Screens: Marble, wrought iron and glass.

Vault and Safe Deposit Provision: Money, safe deposit and book vaults.

Heating and Ventilating: Direct radiation steam heat; reversible system of ventilation.

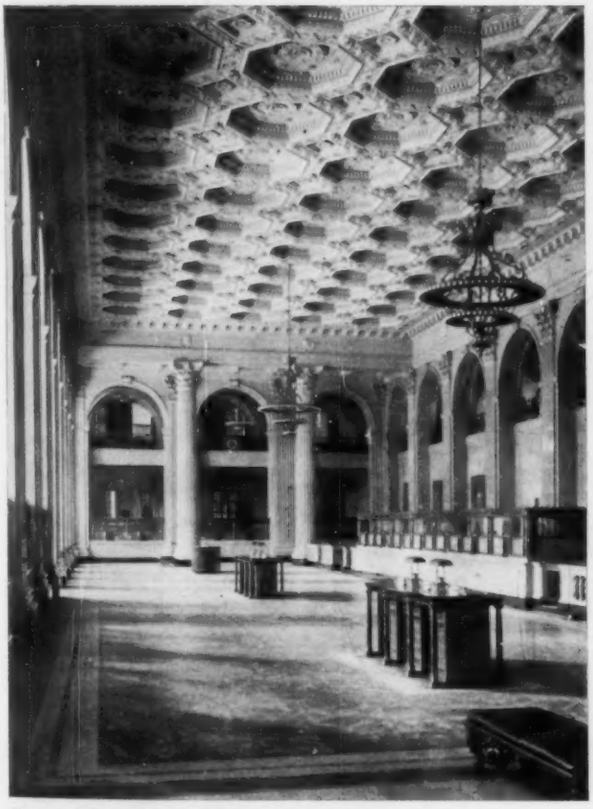



PLAN, SECOND NATIONAL BANK, SAGINAW, MICH.

SMITH, HINCHMAN & GRYLLS, ARCHITECTS


ENTRANCE DETAIL

GENERAL VIEW



*Photos. Tebbs & Knell, Inc.*

GENERAL INTERIOR

*Plan on Back*

OFFICERS' SPACE

CANAL BANK & TRUST CO., NEW ORLEANS

EMILE WEIL, INC., ARCHITECTS

COST AND CONSTRUCTION DATA

Type of Construction: Steel frame; hollow tile floor arches.

Exterior Materials: Indiana limestone front; pressed brick and stone trim elsewhere.

Interior Materials: Marble wainscot and floors; mahogany trim.

Windows: Steel frames and sash.

Counter Screens: Marble and bronze.

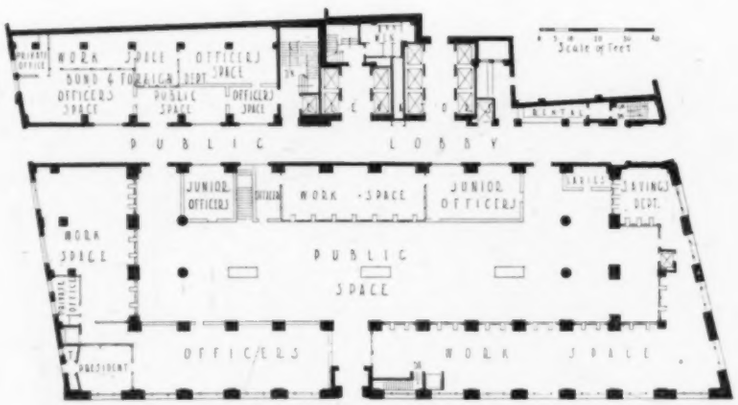
Type of Lighting: Direct.

Heating and Ventilating: Steam heat; forced ventilation.

Date of Contract: March 3, 1926.

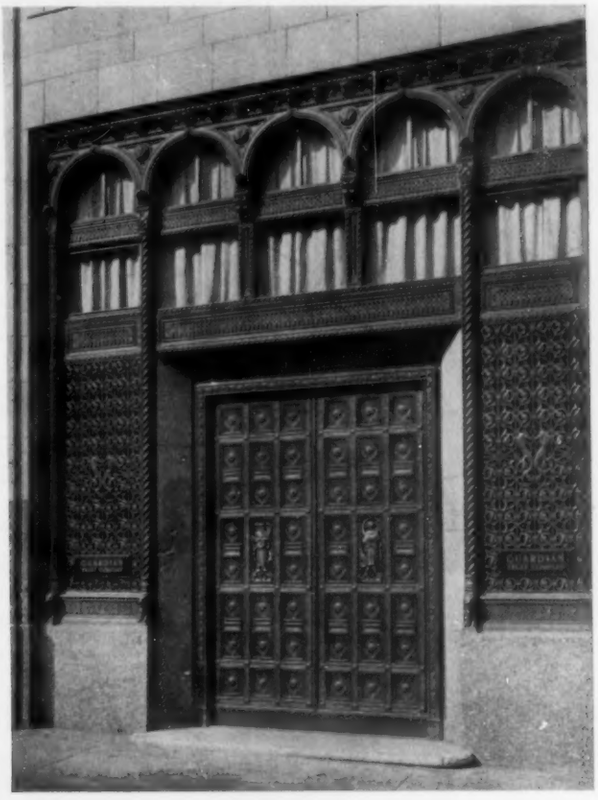
Total Building Cost: Approximately $5,000,000.

Cubic Foot Cost: About 75 cents.




PLAN, CANAL BANK & TRUST CO., NEW ORLEANS
EMILE WEIL, INC., ARCHITECTS

BUHL BUILDING



BANK ENTRANCE

*Photos. Thomas Ellison*

*Plan on Back*

BANKING QUARTERS

GUARDIAN TRUST CO., DETROIT

SMITH, HINCHMAN & GRYLLS, ARCHITECTS

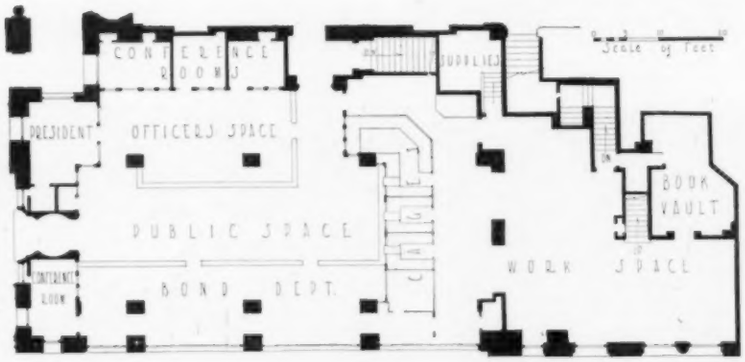
CONSTRUCTION DATA

Interior Materials: Marble floor; wood and marble wainscots; ornamented plaster ceiling.

Windows: Ornamental steel.

Counter Screens: Wood and marble.

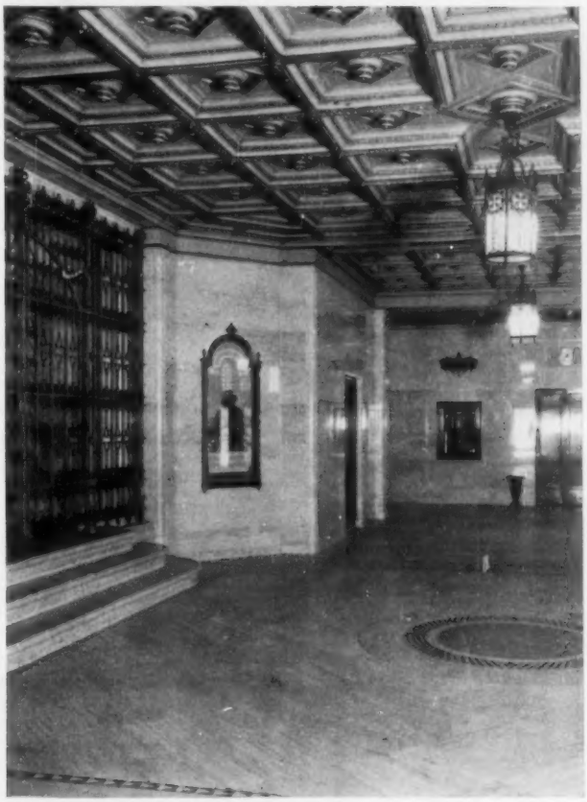
Vault and Safe Deposit Provision: Safe deposit, security and archive vaults.




PLAN, GUARDIAN TRUST CO., DETROIT

SMITH, HINCHMAN & GRYLLS, ARCHITECTS

GENERAL VIEW



ELEVATOR LOBBY

*Photos. Thomas Ellison*

BANKING ROOM

*Plan on Back*

GRAND RAPIDS TRUST CO.

SMITH, HINCHMAN & GRYLLS, ARCHITECTS

CONSTRUCTION DATA

Type of Construction: Concrete foundations; steel frame, concrete fireproofing and floors; brick curtain walls.

Exterior Materials: Granite base; terra cotta facings.

Interior Materials: Marble floor and base; plaster walls and ceiling.

Windows: Cast iron and bronze.

Counter Screens: Marble and bronze.

Vault and Safe Deposit Provision: Security, archive and safe deposit vaults.

Heating: Direct steam.


PLAN, GRAND RAPIDS TRUST CO.
SMITH, HINCHMAN & GRYLLS, ARCHITECTS

GENERAL VIEW

INTERIOR

*Photos. George W. Van Anda*

BANK ENTRANCE

*Plan on Back*

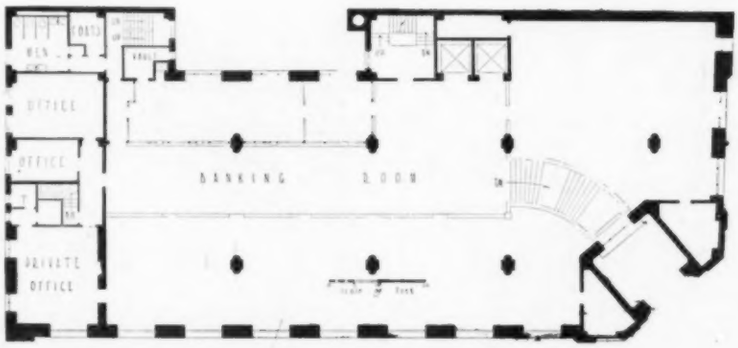
SIDE ENTRANCE

LAWYERS TITLE & GUARANTY COMPANY, WHITE PLAINS, N. Y.

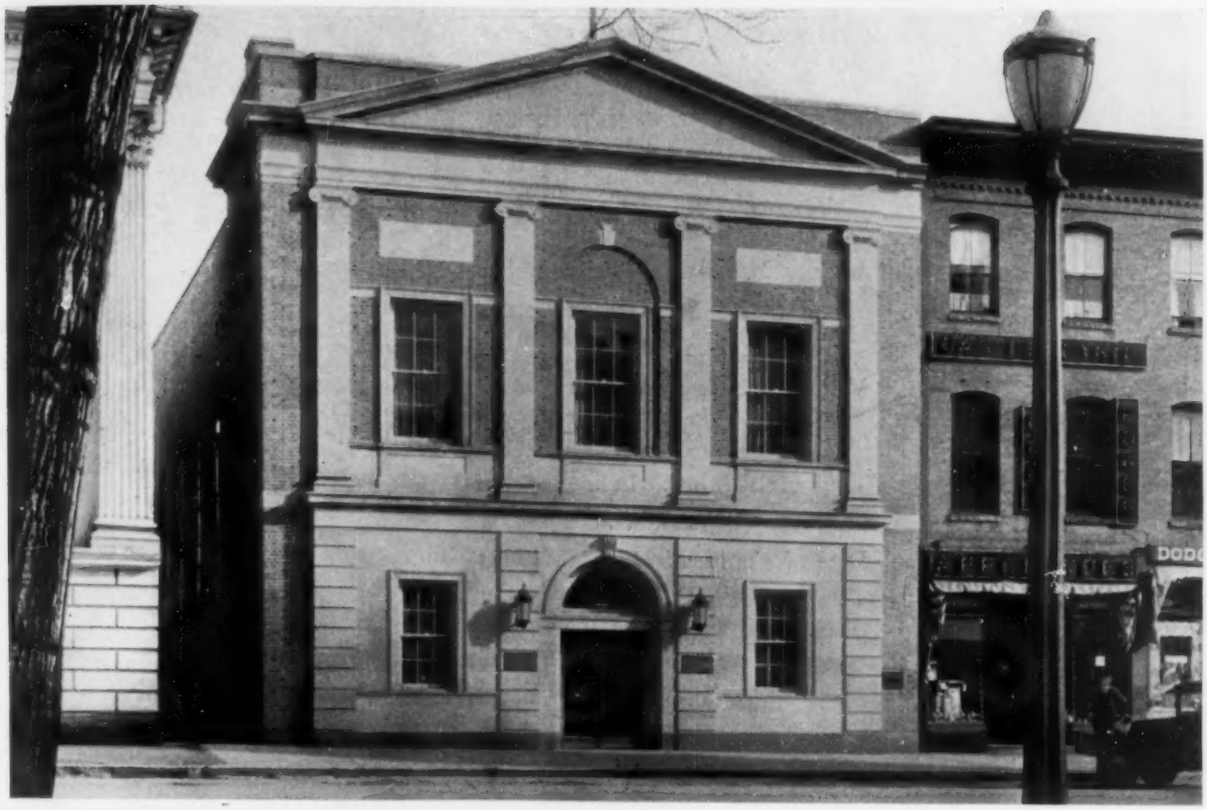
ANDREW J. THOMAS, ARCHITECT

COST AND CONSTRUCTION DATA

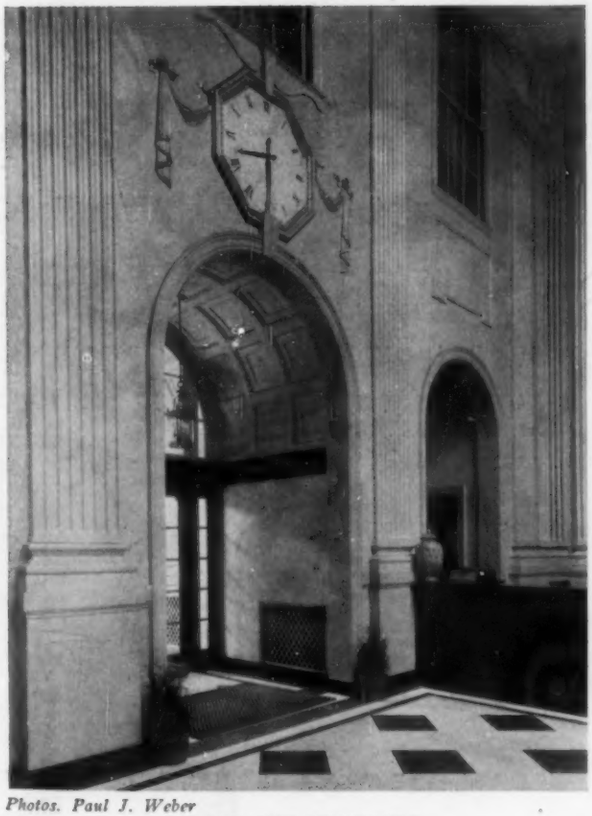
Type of Construction: Fireproof.
Exterior Materials: Cast stone and face brick.
Interior Materials: Wood doors and trim; remainder fireproof.
Windows: Metal frames and sash.
Counter Screens: Marble and wrought iron.
Type of Lighting: Direct.
Heating and Ventilating: Vacuum system.
Year of Contract: 1926.
Total Building Cost: $600,000.



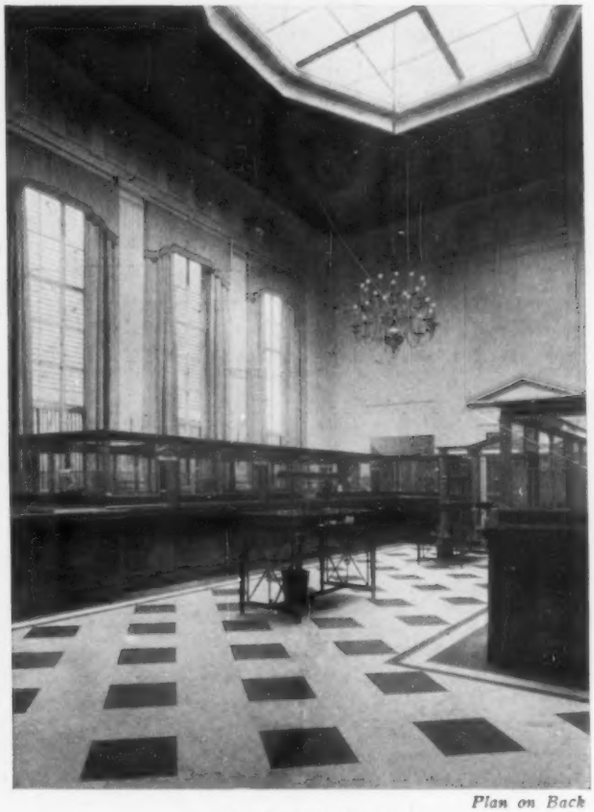

LAWYERS TITLE & GUARANTY TRUST CO., WHITE PLAINS, N. Y.
ANDREW J. THOMAS, ARCHITECT



STREET FAÇADE



ENTRANCE VESTIBULE



BANKING QUARTERS

*Photos. Paul J. Weber* *Plan on Back*

KEENE NATIONAL BANK, KEENE, N. H.

HUTCHINS & FRENCH, ARCHITECTS

COST AND CONSTRUCTION DATA

Type of Construction: Fireproof.

Exterior Materials: Face brick and limestone trim.

Interior Materials: Marble and wood.

Windows: Solid rolled steel sections.

Counter Screens: Marble and painted iron.

Vault and Safe Deposit Provision: Electrically-protected safe deposit, security, book and storage vaults.

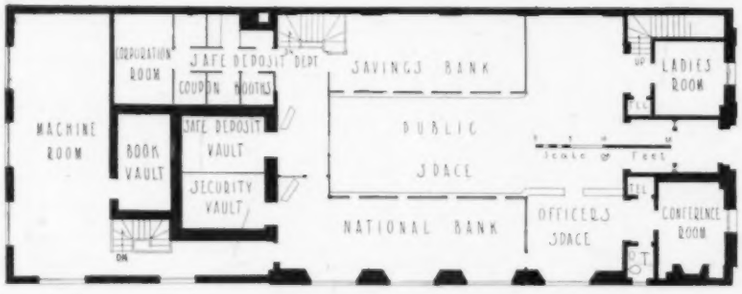
Type of Lighting: Indirect electric.

Heating: Vapor system.

Date of Contract: July 30, 1926.

Total Building Cost: $150,000.

Cubic Foot Cost: 95 cents




PLAN, KEENE NATIONAL BANK, KEENE, N. H.
HUTCHINS & FRENCH, ARCHITECTS


GENERAL VIEW

*Plan on Back*

BANKING ROOM

HUBBARD WOODS TRUST CO., HUBBARD WOODS, ILL.

WILLIAM SPENCER CROSBY, ARCHITECT

CONSTRUCTION DATA

Type of Construction: Steel and concrete.

Exterior Materials: Stone and brick.

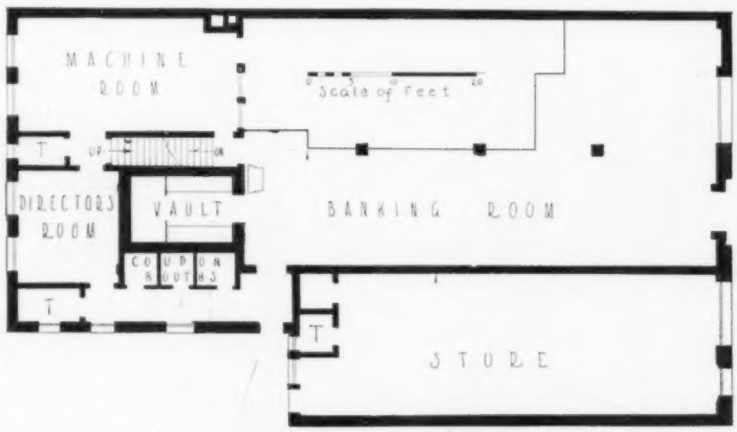
Interior Materials: Wood trim; plaster walls and ceiling; marble floors.

Windows: Wood and metal.

Counter Screens: Marble.

Type of Lighting: Direct electric.

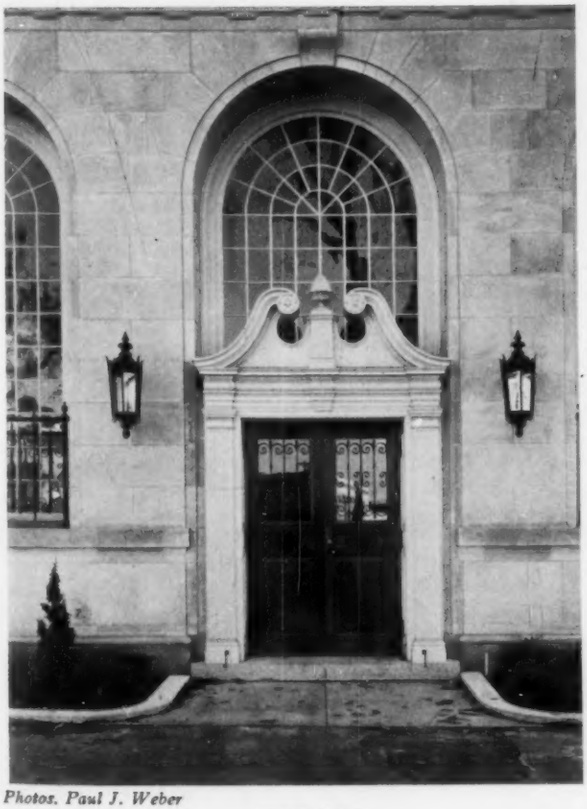
Heating and Ventilating: Hot water heat; exhaust ventilation.




PLAN, HUBBARD WOODS TRUST CO., HUBBARD WOODS, ILL.

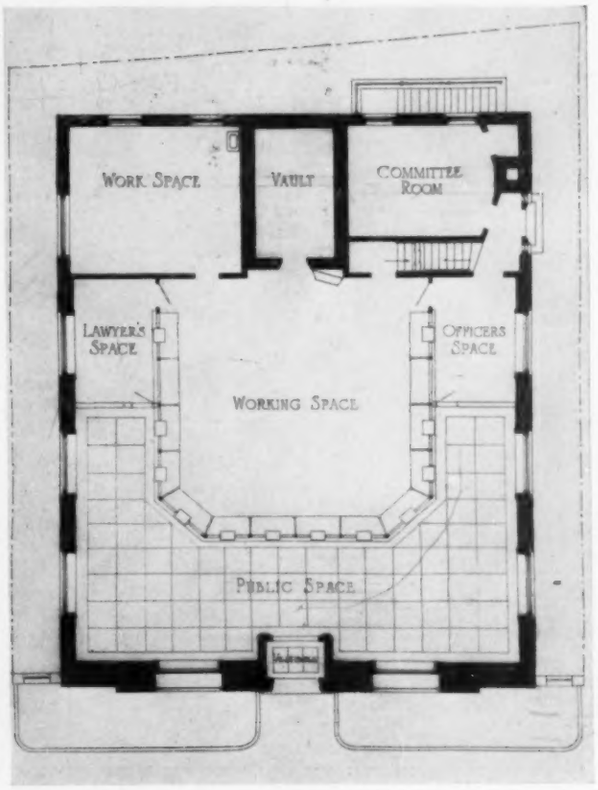
WILLIAM SPENCER CROSBY, ARCHITECT


GENERAL VIEW



*Photos. Paul J. Weber*

ENTRANCE




PLAN

WOBURN CO-OPERATIVE BANK, WOBURN, MASS.

JOSEPH D. LELAND & COMPANY, ARCHITECTS

COST AND CONSTRUCTION DATA

Type of Construction: Semi-fireproof.

Exterior Materials: Brick and limestone.

Interior Materials: Terrazzo floor; plaster walls and ceilings; wood trim.

Windows: Wood, double-hung.

Counter Screens: Wood, glass and wrought iron.

Vault and Safe Deposit Provision: Security and bank vaults.

Type of Lighting: Direct electric lighting.

Heating and Ventilating: Vapor steam.

Date of Contract: September, 1926.

Total Building Cost: $57,600.

Cubic Foot Cost: 51.7 cents.

WOBURN CO-OPERATIVE BANK, WOBURN, MASS.
JOSEPH D. LELAND & COMPANY, ARCHITECTS

GENERAL VIEW

*Photos. Louis H. Dreyer*

*Plan on Back*

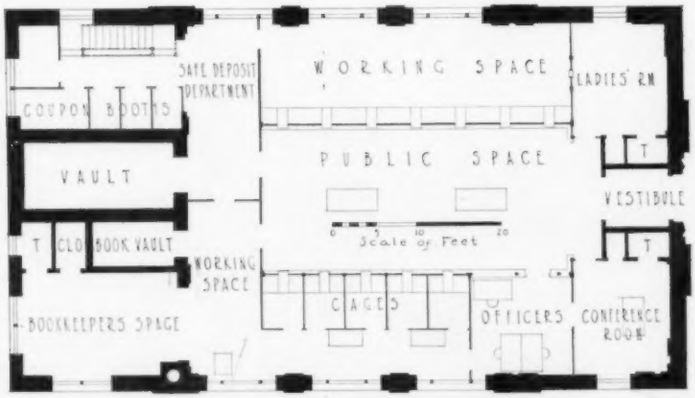
BANKING ROOM

BANK OF NUTLEY, NUTLEY, N. J.

HOLMES & WINSLOW, ARCHITECTS

COST AND CONSTRUCTION DATA

Type of Construction: Fireproof.
Exterior Materials: Face brick and limestone.
Interior Materials: Marble, bronze, and terrazzo.
Windows: Steel.
Counter Screens: Marble, bronze and mahogany.
Type of Lighting: Direct electric.
Heating: Vapor vacuum heat.
Date of Contract: August 19, 1925.
Total Building Cost: $147,500.
Cubic Foot Cost: 93 cents.




BANK OF NUTLEY, NUTLEY, N. J.
HOLMES & WINSLOW, ARCHITECTS


ENTRANCE DETAIL

*Photos. Frances Benjamin Johnston* *Plans on Back*

GENERAL VIEW

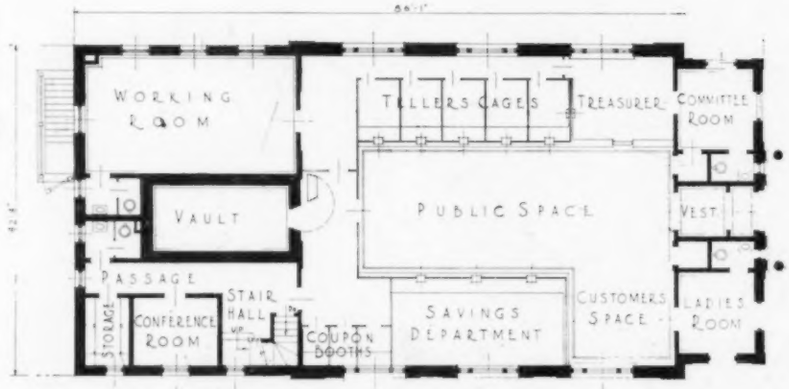
HYANNIS TRUST CO., HYANNIS, MASS.

J. WILLIAMS BEAL SONS, ARCHITECTS

## COST AND CONSTRUCTION DATA

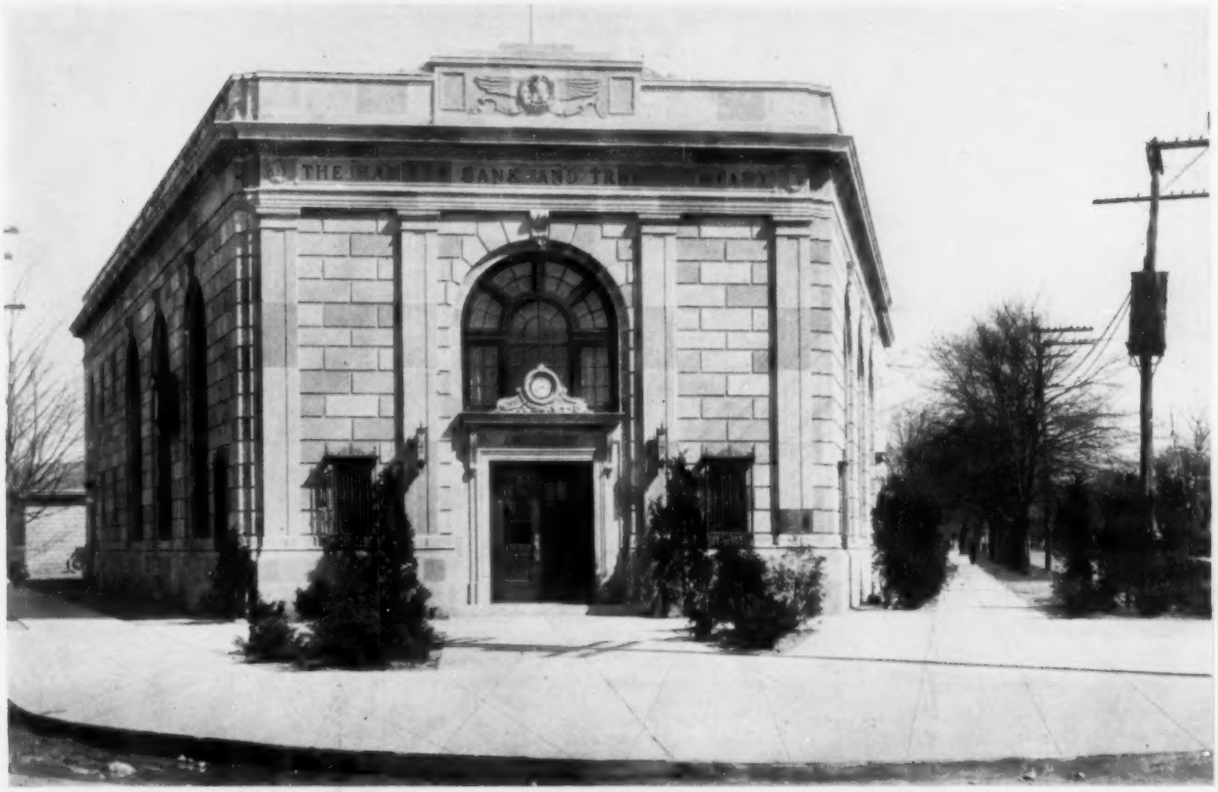
Type of Construction: Masonry walls; concrete floor slabs; wood roof construction.
Exterior Materials: Granite base course; brick walls with limestone trim.
Interior Materials: Gypsum block partitions; plaster walls; mahogany trim; marble and linoleum floors.
Windows: Double-hung wood in banking room; steel casements elsewhere.
Counter Screens: Mahogany, with bronze grilles.
Vault and Safe Deposit Provision: Security door and day gate; safe deposit boxes.
Heating: Two-pipe direct steam.
Date of Contract: March 26, 1923.
Total Building Cost: $98,859.
Cubic Foot Cost: 82 cents.


MEZZANINE FLOOR
SCALE OF FEET




FIRST FLOOR
SCALE OF FEET

PLANS, HYANNIS TRUST CO., HYANNIS, MASS.
J. WILLIAMS BEAL SONS, ARCHITECTS



GENERAL VIEW

*Photos. W. H. Goldenblum* *Plans on Back*

BANKING ROOM

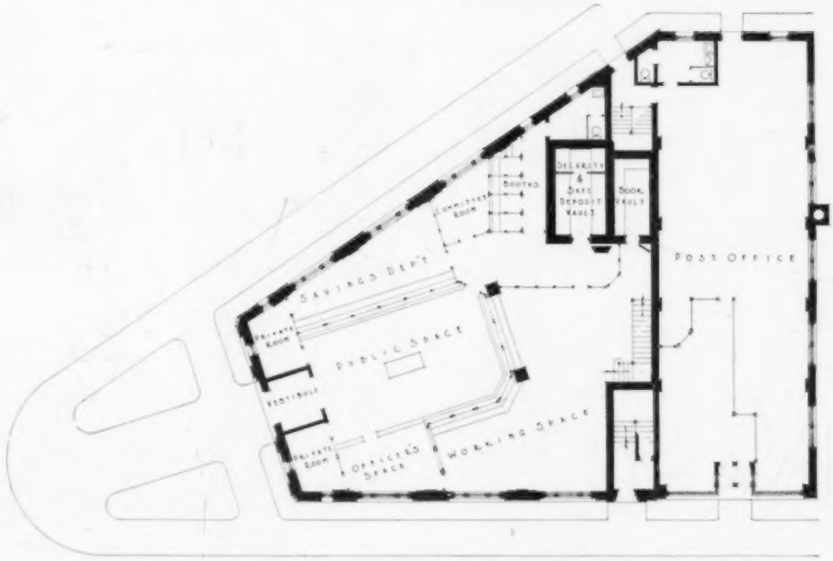
HAMDEN BANK AND TRUST CO., HAMDEN, CONN.

NORTON & TOWNSEND, ARCHITECTS

COST AND CONSTRUCTION DATA

Type of Construction: Masonry walls and concrete floor, with wood roof timbers.
Exterior Materials: Cast stone.
Interior Materials: Rubber tile floor; walnut trim.
Counter Screen: Marble; composition panel; glass top and bronze grille.
Vault and Safe Deposit Provision: Steel-lined, electrically-protected vault.
Total Cost of Building: $78,000, equipped.

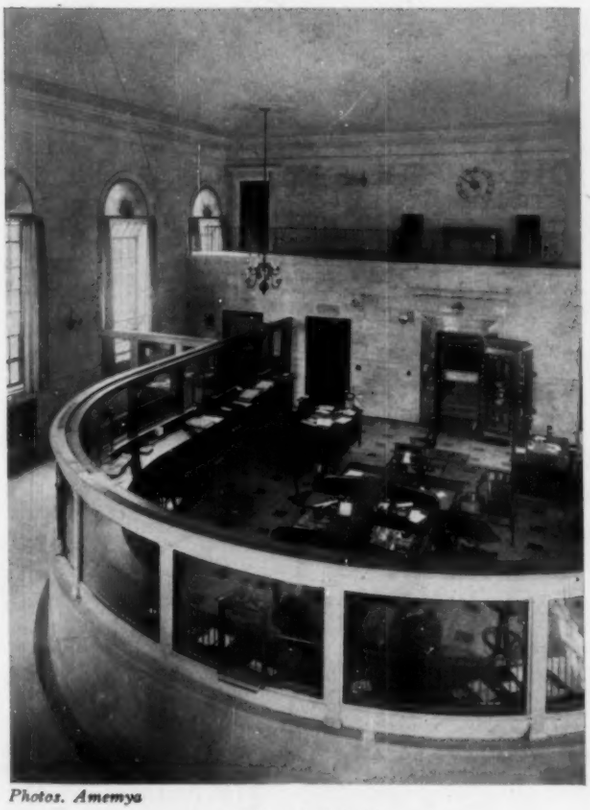

MEZZANINE FLOOR




FIRST FLOOR

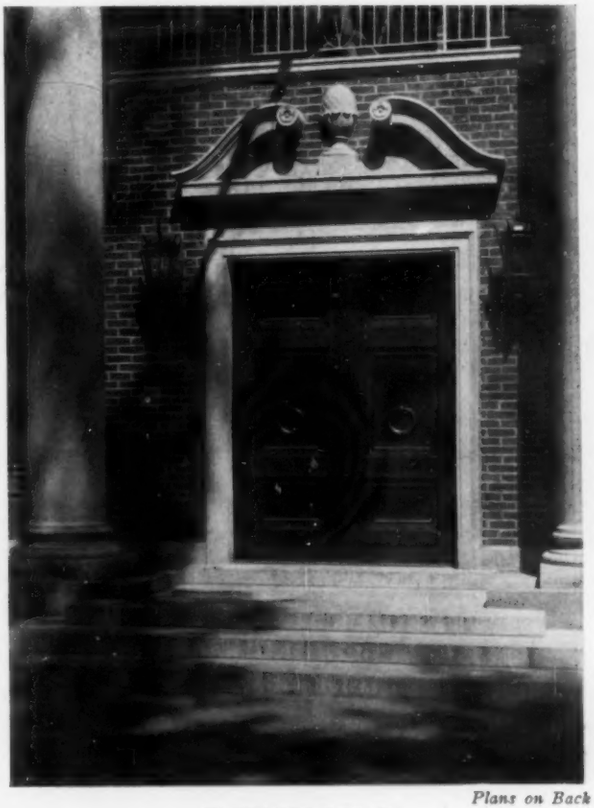
PLANS, HAMDEN BANK AND TRUST CO., HAMDEN, CONN.
NORTON & TOWNSEND, ARCHITECTS

GENERAL VIEW



*Photos. Amemya*

BANKING ROOM



*Plans on Back*

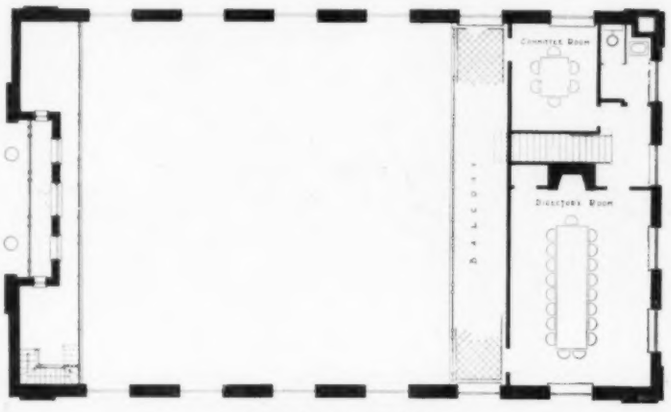
ENTRANCE DETAIL

SOUTHOLD SAVINGS BANK, SOUTHOLD, N. Y.

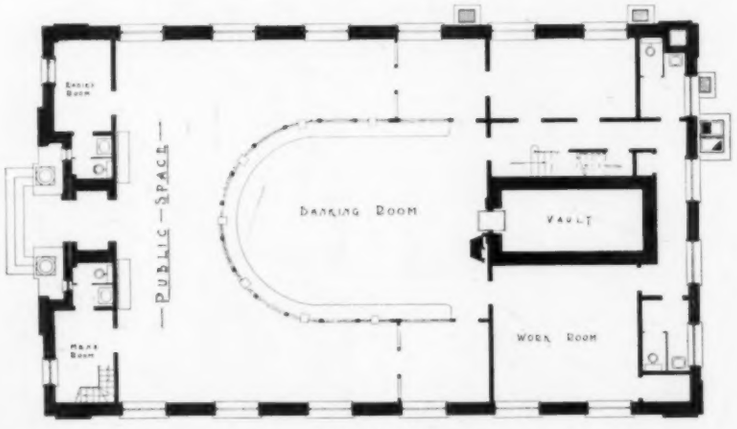
FRANCISCO & JACOBUS, ARCHITECTS

CONSTRUTION DATA

Type of Construction: Brick and steel.
Exterior Materials: Brick and limestone.
Interior Materials: Travertine.
Windows: Bronze.
Counter Screens: Marble and bronze.
Type of Lighting: Direct.
Heating: Semi-indirect hot water.



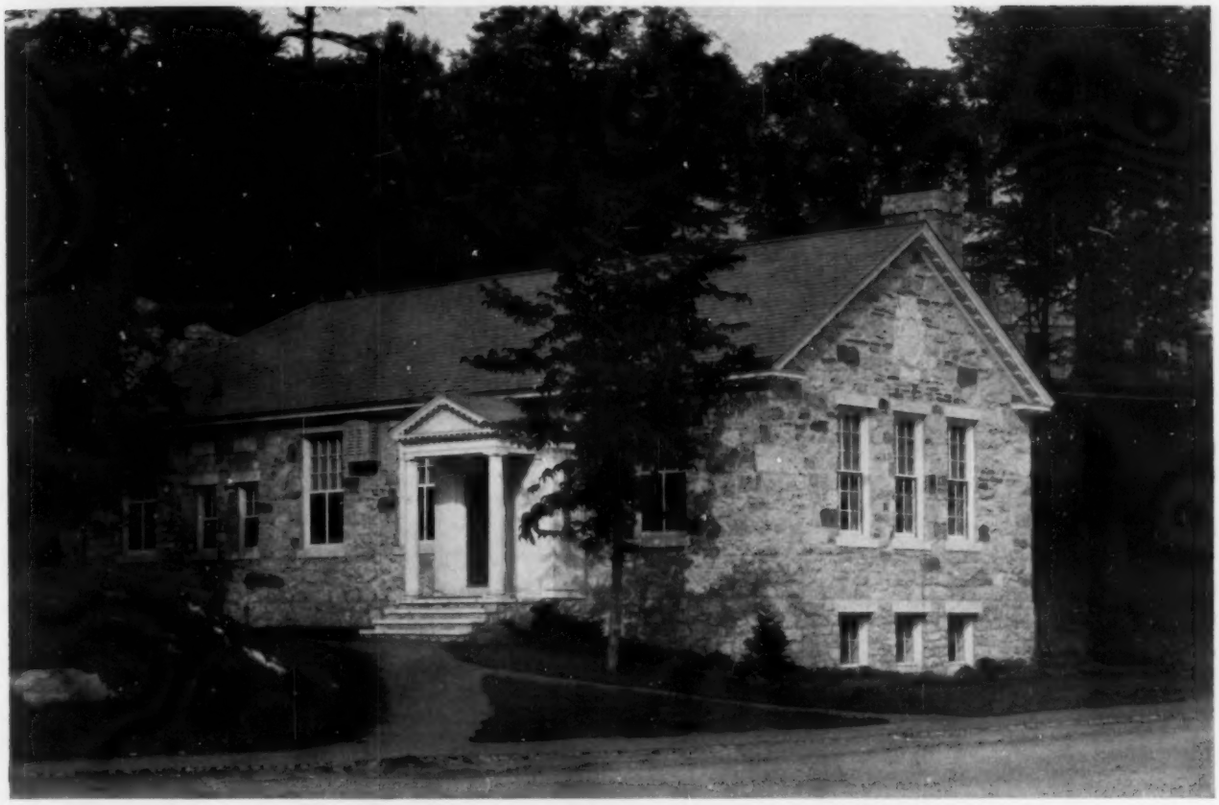

MEZZANINE FLOOR




FIRST FLOOR

PLANS, SOUTHOLD SAVINGS BANK, SOUTHOLD, N. Y.

FRANCISCO & JACOBUS, ARCHITECTS



GENERAL VIEW

*Plan on Back*

BANK SCREEN

PROCTOR TRUST CO., PROCTOR, VT.

R. CLIPSTON STURGIS, ARCHITECT

COST AND CONSTRUCTION DATA

Type of Construction: Concrete floor slabs; wood roof frame; masonry walls.

Exterior Materials: Rock-faced marble.

Interior Materials: Plaster, and wood trim.

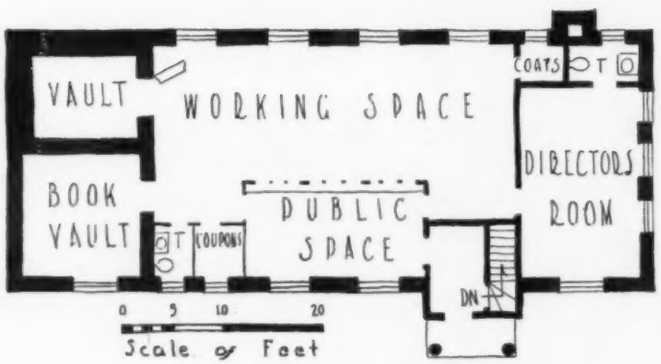
Windows: Wood.

Counter Screens: Wood and glass.

Type of Lighting: Direct.

Date of Contract: January 15, 1923.

Cubic Foot Cost: 64.5 cents.




PLAN, PROCTOR TRUST CO., PROCTOR, VT.

R. CLIPSTON STURGIS, ARCHITECT

# THE PHILADELPHIA SAVING FUND SOCIETY BRANCH OFFICES

BY
GEORGE HOWE, ARCHITECT

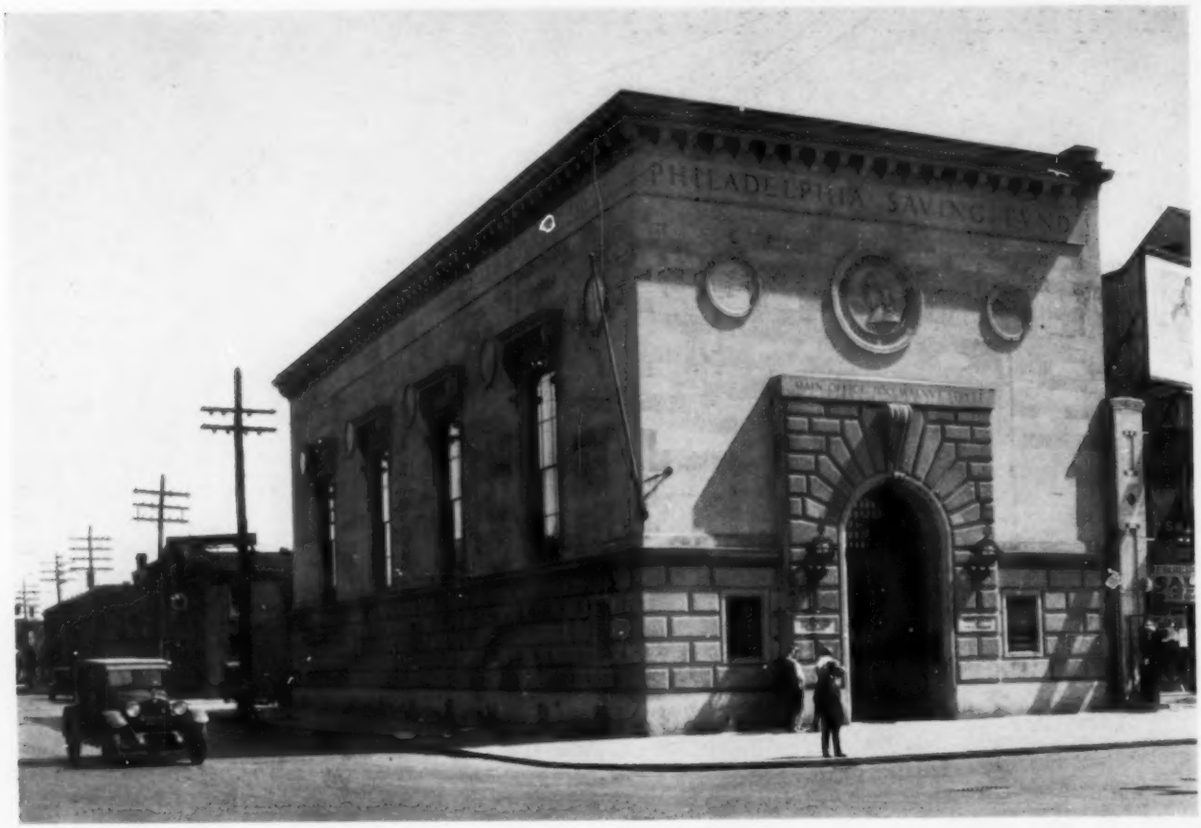
SOME years ago the Philadelphia Saving Fund Society adopted a policy of opening branch banks in various sections of the city, primarily to accommodate its depositors who, in the modern development of the city, had gradually been moving their homes farther away from its center, and secondly and incidentally to meet the competition of other institutions which were and are prosecuting a vigorous campaign for savings bank depositors. The first building erected under this policy was the South Office, at Broad and McKean Streets. At the same time another branch of exactly the same type was erected at 11th Street and Lehigh Avenue, in the northern section of the city. Two years later followed the building of the branch office in West Philadelphia, at 52nd and Ludlow Streets, which took the place of a temporary office which had been established in an old building at the same location some years before. At the same time another new office of similar type was established at Broad and Ruscomb Streets, some distance farther north than the Lehigh Avenue Office. A year later there followed the building of a Central City Office on 12th Street just below Market Street. This last is a temporary building, established to give immediate service to test the requirements of a much more important office to be erected at the corner of these two streets upon the expiration of existing leases.

All these offices are branches and are connected by every modern means of electrical communication with the Main Office at 7th and Walnut Streets, where the chief administrative work is done. The plans of these buildings are therefore of the simplest nature, consisting only of working spaces, public spaces, and small rooms for the managers. In the second type of branch office, at 52nd and Ludlow Streets and at Broad and Ruscomb Streets, safe deposit vaults have been added for the convenience of depositors. This feature has proved popular.

Since, then, the plans of these branch banks are so simple, their chief interest lies in their design. In each of the types a different idea underlies the composition. In the first building erected the architect conceived the double function of the savings bank building, first as a magnified strong box, and second as a working space. Following this conception, the lower part of the building was encased in a strong band of rusticated stone, with deep, narrow windows and a door of heavy oak studded with large iron nails. This lower band expresses the idea of the strong box. Above this band was placed a lofty expanse of plain wall pierced by large windows to furnish ample light. These windows suggest the working area. Apart from this expression of the dual function of a savings bank building, the exterior design is planned in accord with accepted tradition.

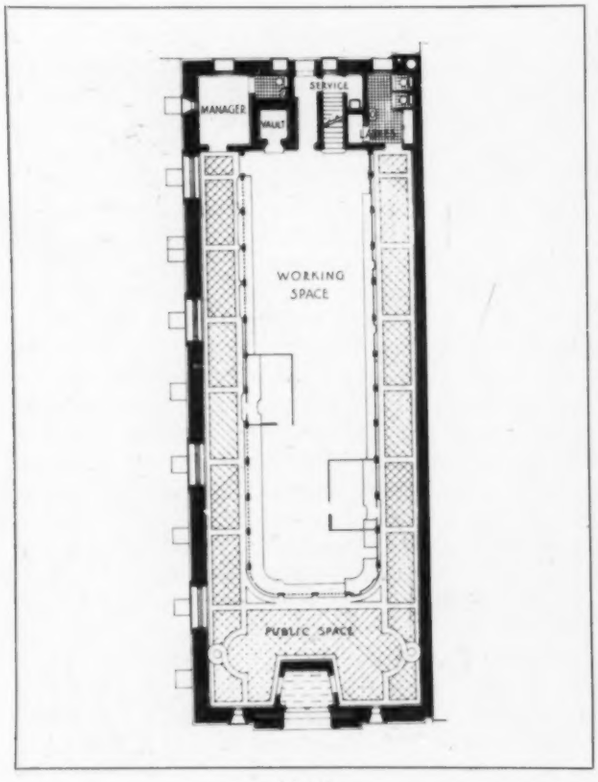
After building the first two branch offices, the architect decided that in conformity with modern commercial practice the old idea of the strong box, as expressed in the building itself, should be given less emphasis, though the general solidity of aspect should be preserved. Freed from emphasis of its fortified base, the building was thought to be more inviting to a timid public. Furthermore, it was decided to employ illumination as a publicity device. The whole building was therefore designed around this double conception,—the large, hospitable entrance door, closed only at the bottom by a richly ornamented grille, and the illuminated inscriptions, which necessitated, or rather suggested, the service balconies and the multiple reflectors of wrought iron which form the chief features of the elevations. This system of illumination has proved very successful in competition with the illuminated letter signs which fill the street of an evening. The great block of stone, flooded in strong white light, dominates the illumination, while at the same time the building preserves its dignity. The walls are again of limestone with a granite base, surmounted by a slag roof behind a parapet. The cornice, having become superfluous with such a system of roof construction, has been eliminated. The interior is again traditional, with a vaulted ceiling and a high banking screen. Wood was abandoned as a material for the screen, however, as it was found to twist and crack, even though constructed with great care, and stone with verde-antique inlay was substituted. The floor is of the same materials. The suspended lights in the form of celestial and terrestrial globes can be seen from the street at night through the large opening in the front of the building and form a very striking ornamental element in the composition, as well as being an excellent advertisement. The admirable ironwork was designed and executed by Samuel Yellin, in coöperation with the architect. On the exterior, as will be seen from the illustrations, two illuminated transparencies have been provided under the wall lamps, one on each side of the main entrance. The frames are movable, and special colored transparencies for displaying educational suggestions and seasonable and other services may be introduced. As this is the only office of the five under discussion which replaced a structure already existing, it is interesting from the architect's point of view to note that a phenomenal increase of business followed the erection of the new building.

The problem presented by the Central City Office at 12th and Market Streets was entirely different. The Philadelphia Saving Fund Society had acquired at this location for the erection of a general office a much larger tract than that covered by the present building, but what functions exactly this office was




*Photos. Ph. B. Wallace*

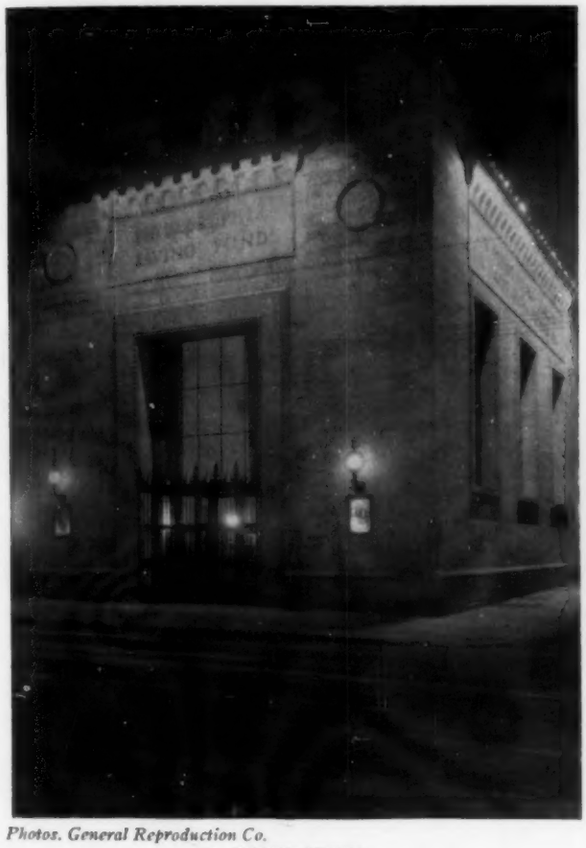
GENERAL VIEW




PLAN

BANKING ROOM

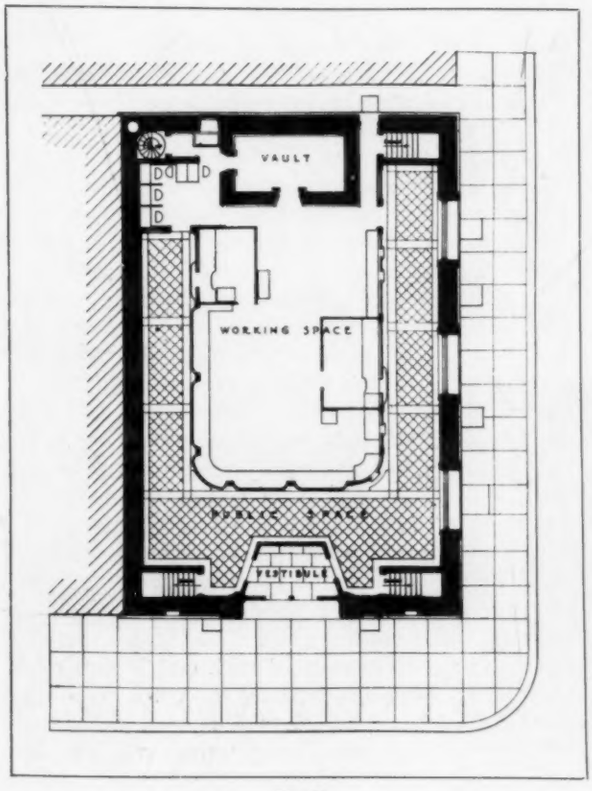
SOUTH BRANCH, PHILADELPHIA SAVING FUND SOCIETY
GEORGE HOWE, ARCHITECT



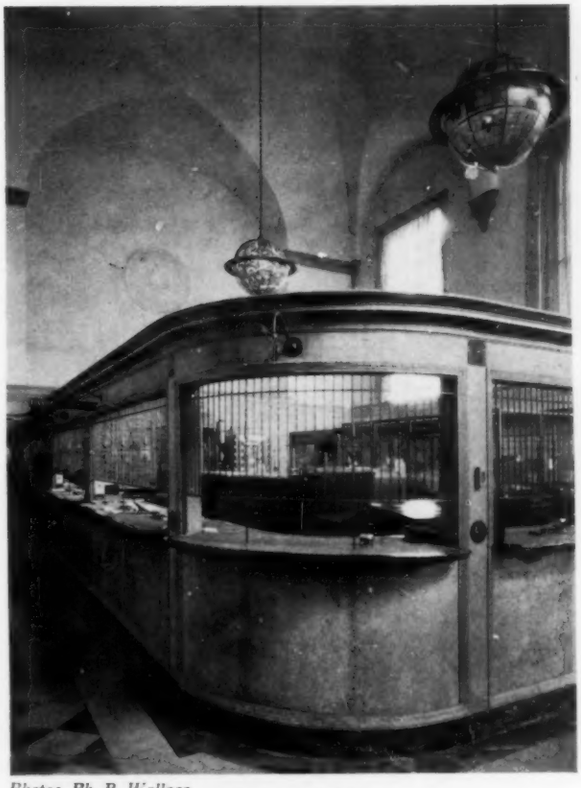
*Photos. General Reproduction Co.*

NIGHT VIEW

EXTERIOR VIEW




PLAN

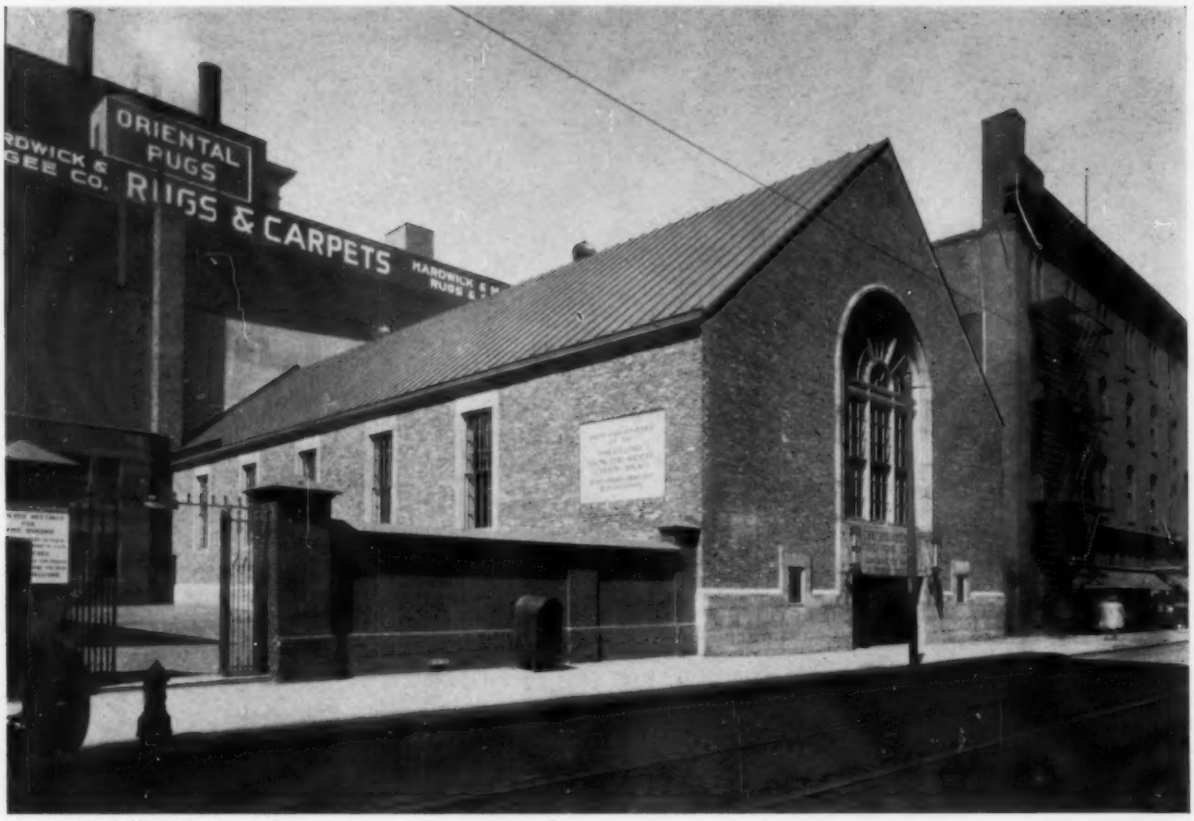


*Photos. Ph. B. Wallace*

BANK SCREEN

WEST BRANCH, PHILADELPHIA SAVING FUND SOCIETY

GEORGE HOWE, ARCHITECT




*Photos. Ph. B. Wallace*

Central City Office, Philadelphia Saving Fund Society
George Howe, Architect


Entrance Detail

to take over from the already existing downtown office remained to be determined. The problem then consisted in erecting a temporary office on a portion of the property which was immediately available for construction purposes. The operation of this office was to determine the number of depositors, both present and future, it would be reasonable to provide for at the location. The architect therefore approached the problem in an entirely different spirit from that in which he had designed the four permanent offices previously built, as it would have been folly to construct a temporary office otherwise than economically. The use of the most straightforward, modern materials, both for construction and ornament, seemed the only reasonable proceeding. The building therefore assumed the shape of a large shed, spanned by iron trusses exposed on the interior. The walls were built of second-hand brick and all the architectural features were made of rough-cast concrete. The roof was made of tin, and the sash were made of wood as an exceptional enrichment; the main entrance door was made of calamite bronze ornamented with cast bronze studs, and the lanterns and lettering over the door were made of bronze also. Everything was designed in the simplest and most inexpensive way, yet with sufficient generosity of scale to lend dignity to the plain materials. The building was furthermore designed to accord with the old Quaker Meeting

*Photos. Ph. B. Wallace*

Entrance Lobby

Banking Room

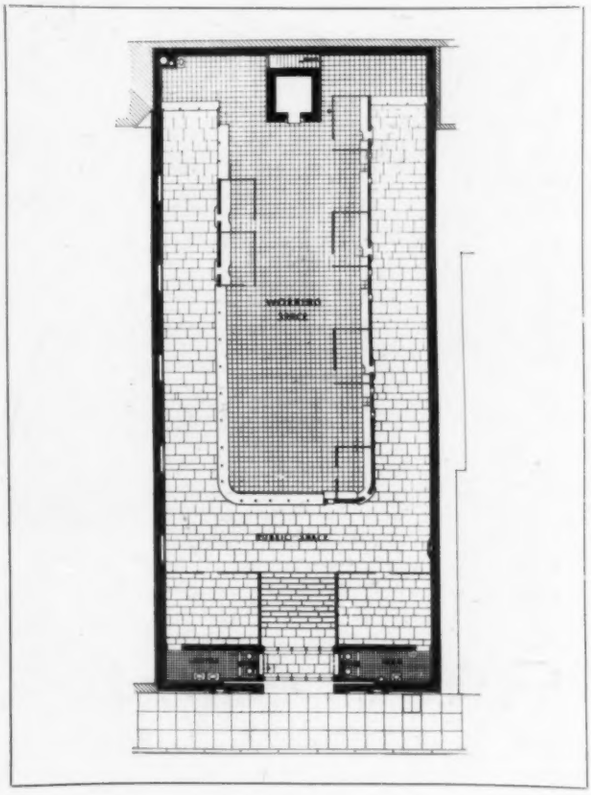
Central City Office, Philadelphia Saving Fund Society

George Howe, Architect

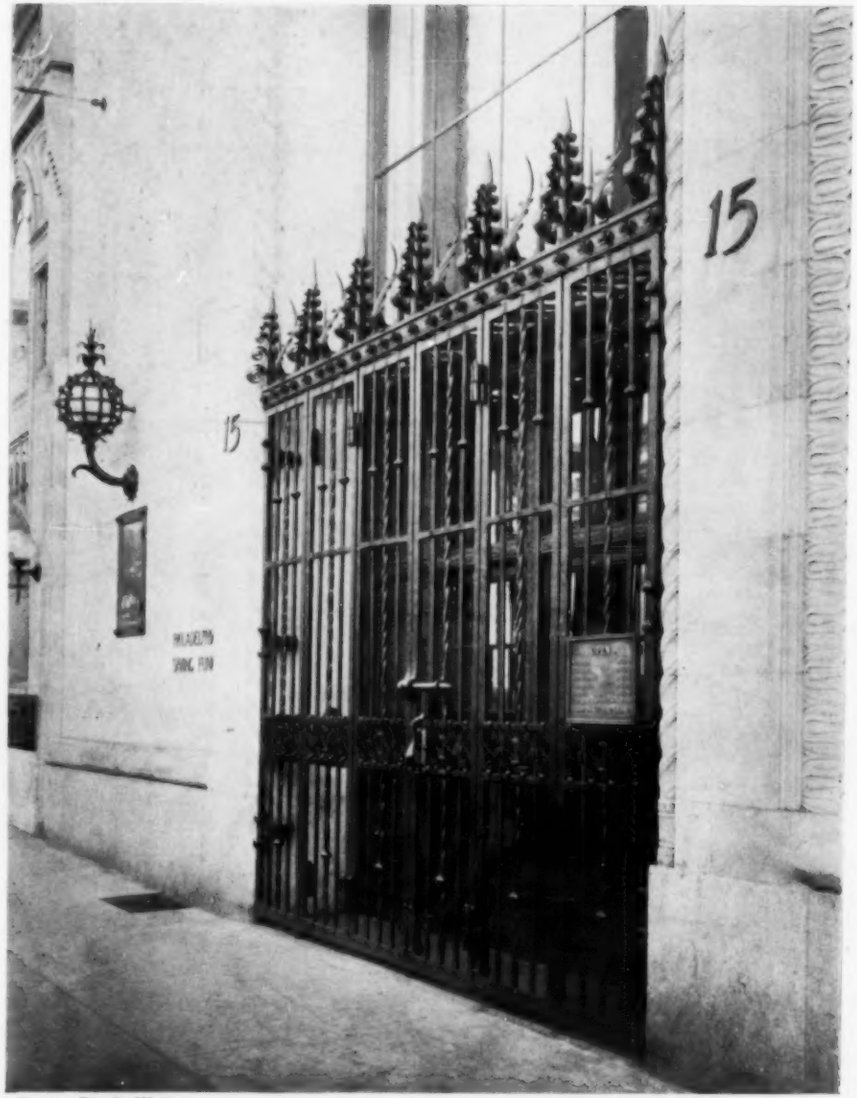
House which stands next to it, as the enclosure wall and gate indicate in one illustration of the exterior. It is also to be noted that had the building been permanent, it would have been unwise to light it from the open space provided by the yard, which belongs to the Meeting House, and may be built upon. As a measure of economy, which was important, and in order that there might be no conflict between the metal furniture inside the counter and the ornamental treatment of the building, it was decided to have the electric fixtures, both the standards on the counter and the brackets on the wall, built by the metal furniture manufacturer, as also the enclosure rails on either side of the entrance. These elements were designed especially for economical sheet metal construction. Furthermore, in order to hold the design together by its color, the floor was paved with green slate, to harmonize with the green metal furniture; the front of the screen was painted a pale green, and the trusses in the roof a darker green.

The success of this experiment in the use of modern mechanical elements and methods in the design of utilitarian and ornamental features, suggested in large measure by the fact that the building was temporary, seems to indicate a field of design rich in possibilities even for permanent buildings.

Editor's Note: These banks were designed by Mr. Howe during the period when he was a member of the firm of Mellor, Meigs & Howe, of Philadelphia.



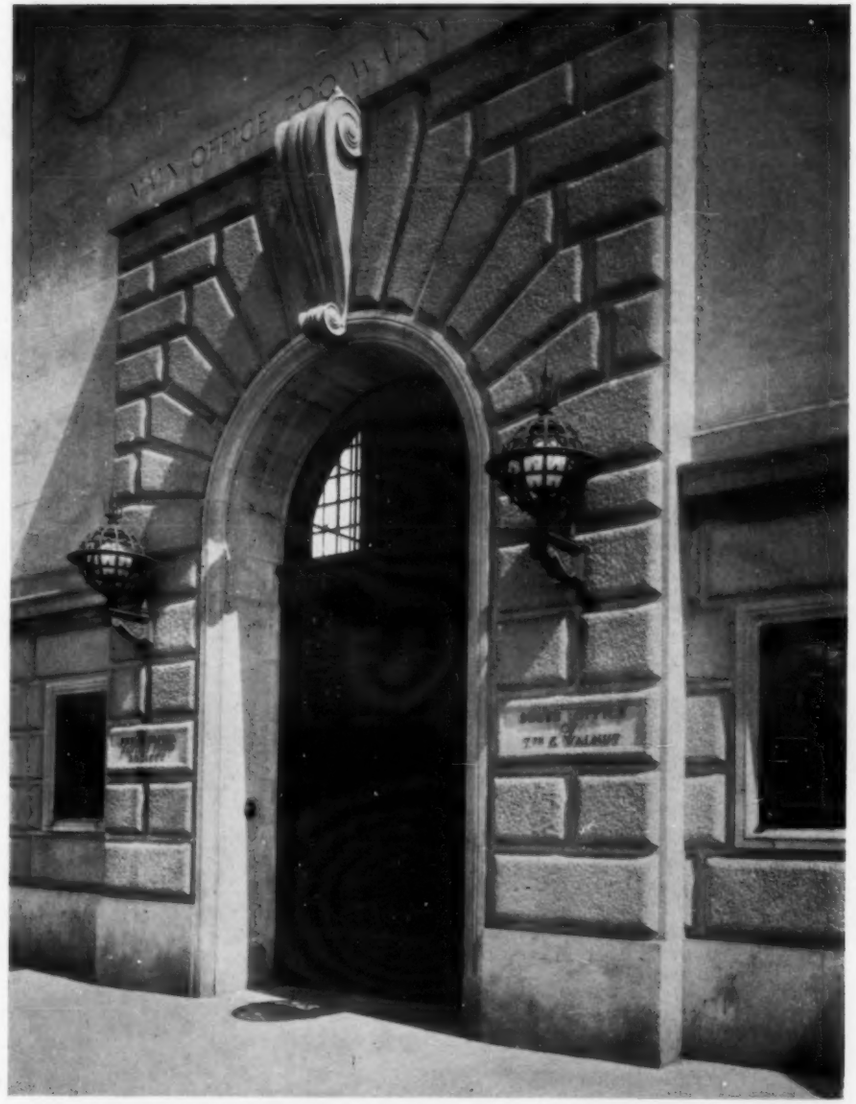
Plan




*Photos. Ph. B. Wallace*

WEST BRANCH, PHILADELPHIA SAVING FUND SOCIETY

GEORGE HOWE, ARCHITECT



SOUTH BRANCH, PHILADELPHIA SAVING FUND SOCIETY

GEORGE HOWE, ARCHITECT

# RECENT BANKS BY DAVIS, DUNLAP & BARNEY

BY

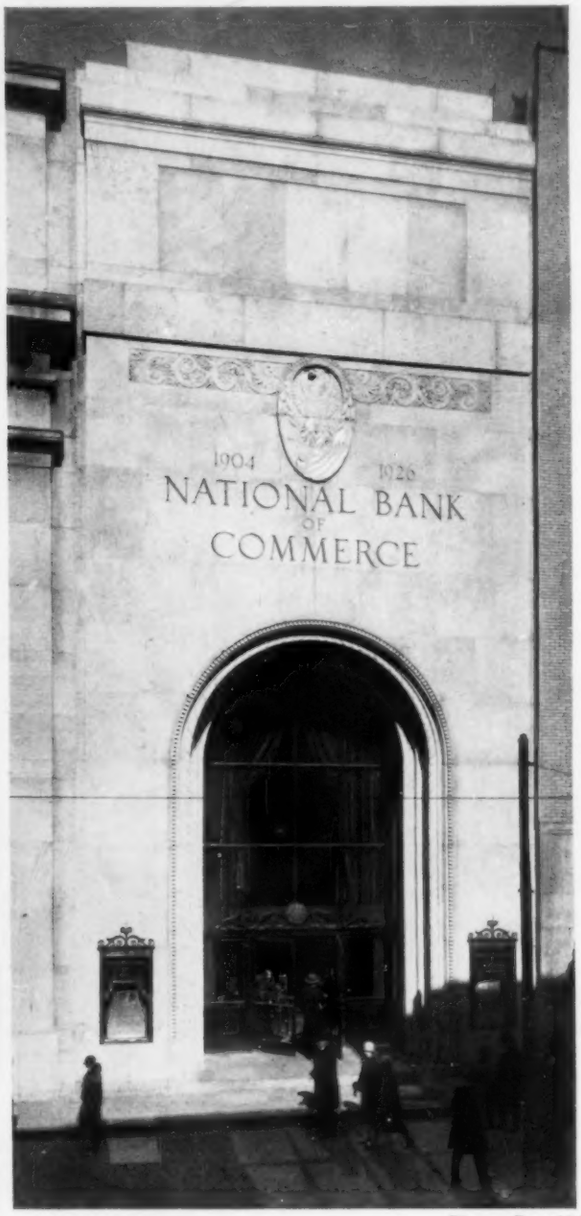
PARKER MORSE HOOPER

A NEW expression has come into the designing of bank buildings. Not only in New York and Philadelphia is this noticeable but also in the middle west and on the Pacific coast. This new note is largely one of simplicity in treatment and concentration of architectural detail to relieve and contrast with the severity of plain and unbroken wall surfaces. In the east this tendency toward simplification in bank design is particularly noticeable in the work of some of the younger architects. The use of columns, free standing and engaged, pilasters and heavy entablatures, following academically or freely the several classic orders, entirely disappears in the work of these younger architects. The Greek and Roman temples, the triumphal arch motif and the Italian Renaissance palazzo as architectural precedents for bank designs are fortunately giving way to simple elevations with plain wall surfaces of smooth finished stone and marble, broken up by large and well proportioned openings. The jail- and fortress-like type of bank is fast disappearing, to be replaced by a more consistent and


*Photos. Ph. B. Wallace* *Plan on Page 888*

Tenth National Bank, Philadelphia

Davis, Dunlap & Barney, Architects




*Plan on Page 888*

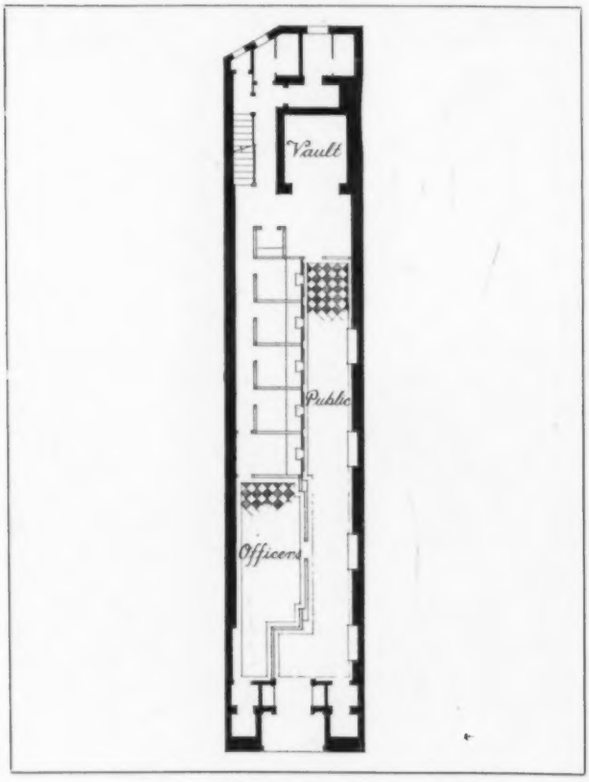
National Bank of Commerce, Philadelphia

Davis, Dunlap & Barney, Architects

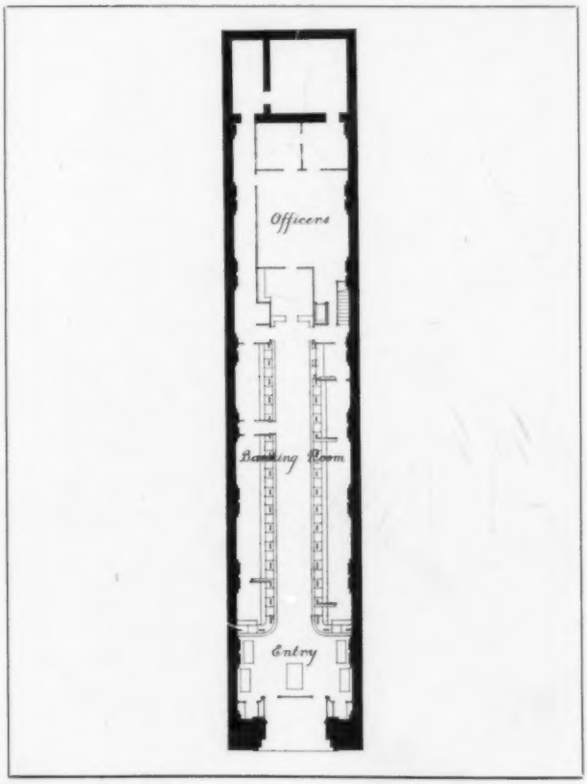
TENTH NATIONAL BANK, PHILADELPHIA
DAVIS, DUNLAP & BARNEY, ARCHITECTS

*Photo. The Photo-Illustrators* *Plan on Page 889*

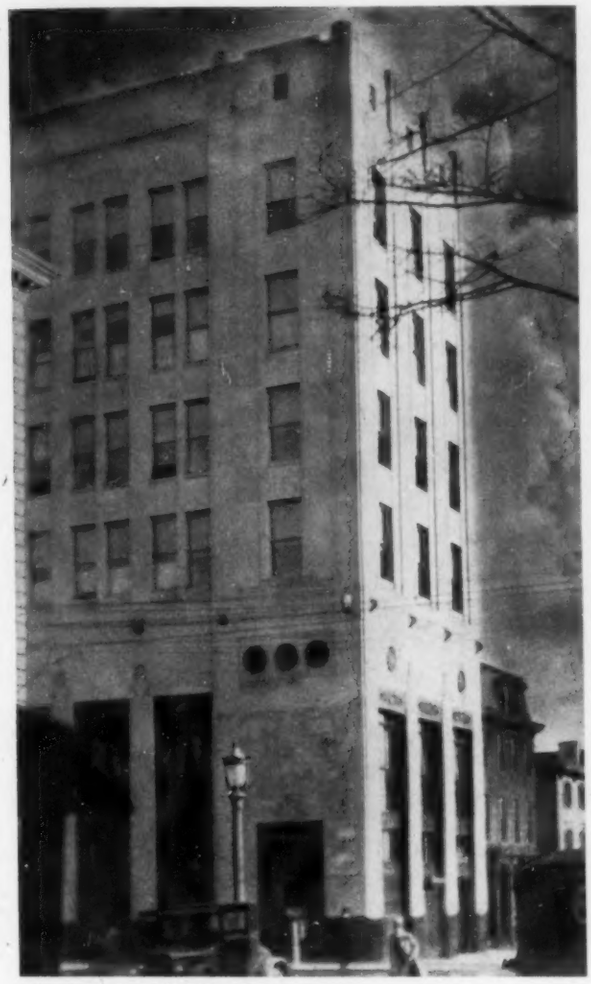
FAIRHILL TRUST CO., PHILADELPHIA
DAVIS, DUNLAP & BARNEY, ARCHITECTS

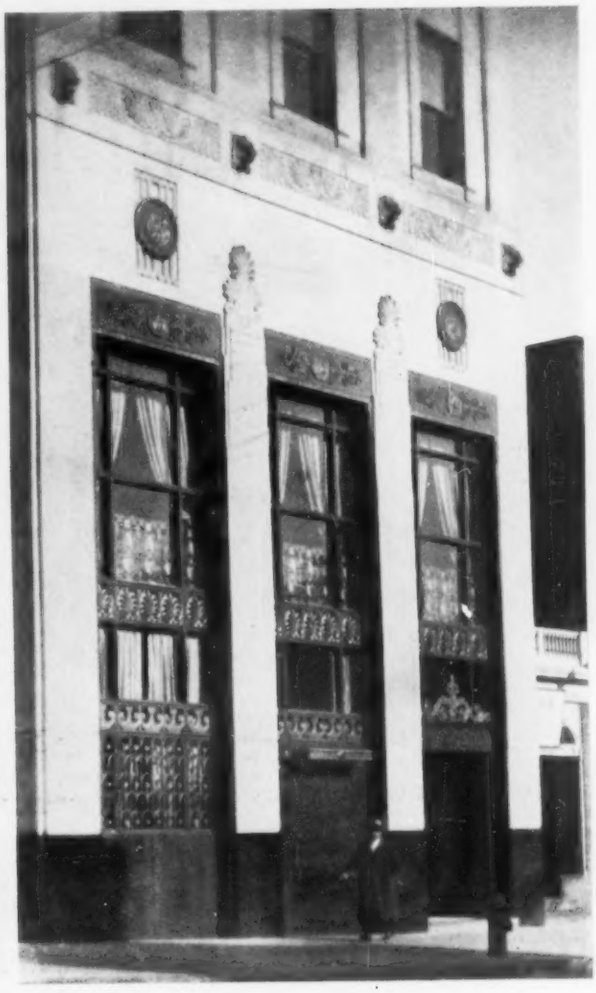



PLAN, TENTH NATIONAL BANK




PLAN, NATIONAL BANK OF COMMERCE



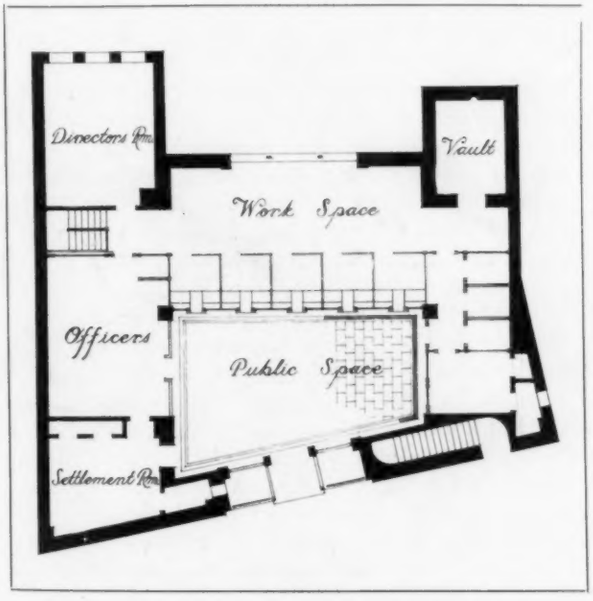


*Photos, William M. Rittase*

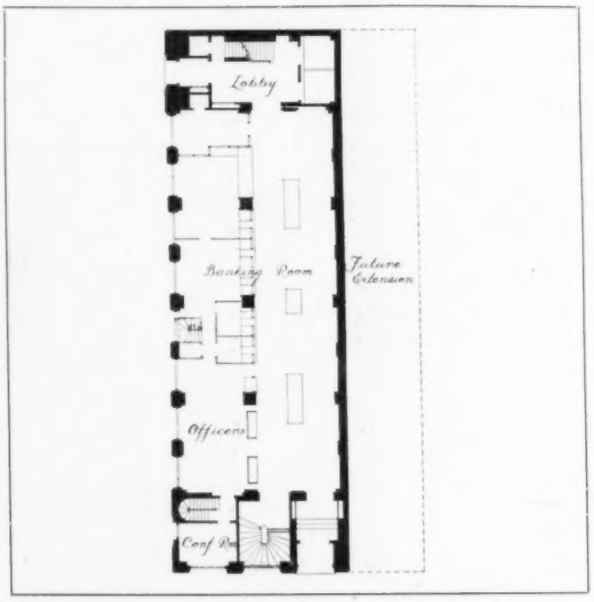
GENERAL VIEW ENTRANCE FACADE

WEST PHILADELPHIA TITLE & TRUST CO.

DAVIS, DUNLAP & BARNEY, ARCHITECTS




PLAN, FAIRHILL TRUST COMPANY




PLAN, WEST PHILADELPHIA TITLE & TRUST CO.


*Photo. William M. Rittase*

The Fairhill Trust Company, Philadelphia
Davis, Dunlap & Barney, Architects

*Plan on Page 889*

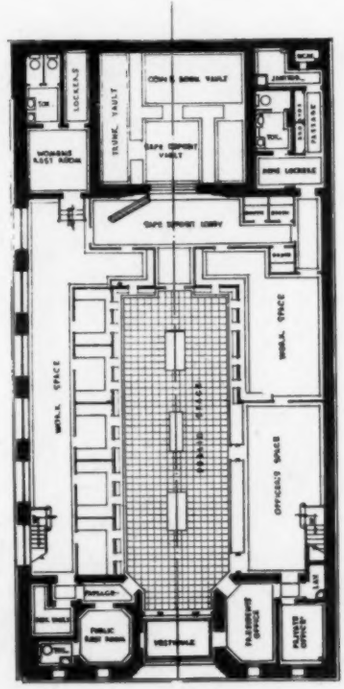
intelligent design, one more practical and more appropriate for this specialized type of commercialized architecture. The very nature of the banking business demands large, well lighted enclosures.

In some of the banks recently designed by Davis, Dunlap & Barney, of Philadelphia, this freshly appreciated consistency in bank architecture is shown in a splendid and satisfactory manner. There is no indication in any of their designs of the influence of so-called "modernistic" architecture. There is, instead, a renewed appreciation and interpretation of Greek and Roman architectural ornament. In the West Philadelphia Title & Trust Company, a six-story bank building on a corner plot, there is found an original use of freely adapted Greek and Roman classic ornament. This ornament is logically placed on the lower portion of the building, where it may be seen and appreciated by the passerby. The four upper stories are severely plain, terminating in a high parapet at the roof line. The Tenth National Bank building occupies a narrow plot at the middle of a block. The chief feature of the design is a high, rectangular opening in perfect scale and proportion with the height and width of the simple facade. Tall slabs of black and white marble are effectively used as the base course of this original design, which possesses unusual individuality and charm. This black marble is effectively used again in the decorative panel placed as a crowning feature of the entrance to the building. Incised decorations, reminiscent of Roman ornament successfully relieve what might otherwise be the severity of the design.

The design of the National Bank of Commerce, although less original, perhaps, than the two banks just described, shows the same appreciation of scale and simplicity. A single arched opening of excellent proportions serves as the entrance to this bank. The doors themselves are sufficiently plain in design to appear as a part of the window treatment of this great opening. No high and massive iron grille or gate shuts the public out. The effect of the entrance as a whole is hospitable and inviting, giving the impression of an open and unobstructed archway. As will be seen from the plan, the depth of this bank is many times its width, so that there is no particular reason or purpose in having a higher or wider opening at the street end. The shape of the lot necessitated that the lighting be obtained from the skylights and not from windows. The Fairhill Trust Company building is even more individual in design. The main banking room is indicated on the exterior by one great rectangular opening flanked by broad piers or pylons, crowned with a high panel bearing the name of the bank. A low cornice of simple moulding caps the whole design. The working space and private offices are also indicated in the exterior design by the low wings, which flank the main part of the building. This unusual treatment is distinctly Roman in effect, as is also the design of the bronze work of the entrance grilles and the detail of the pilaster capitals and architrave above. It is refreshing and encouraging to find such delightful architectural feeling and good taste as are shown in the design of this interesting building.


*Photo. Mott Studios*

GENERAL VIEW

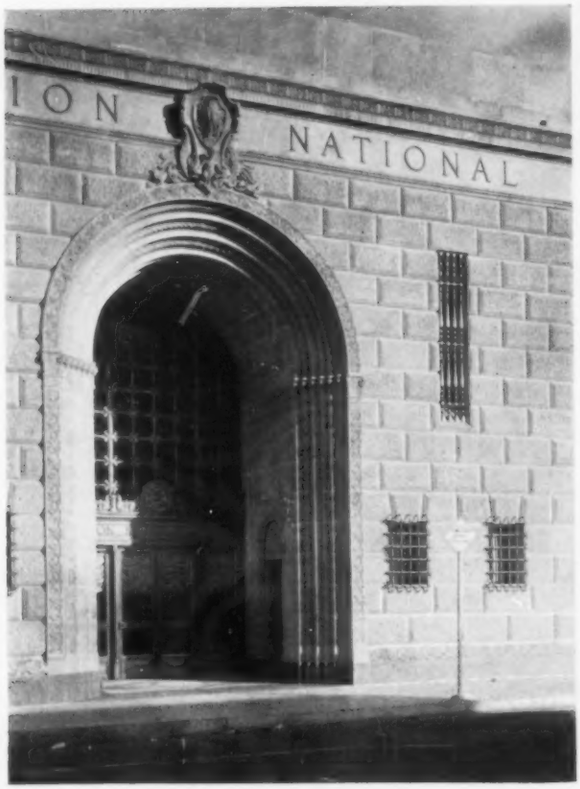


FIRST FLOOR

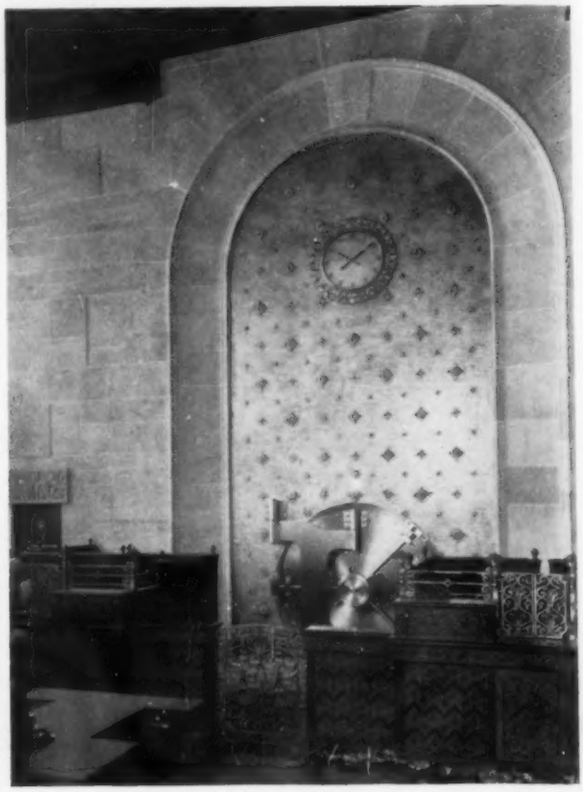

MEZZANINE

UNION NATIONAL BANK, VENTURA, CAL.

MORGAN, WALLS & CLEMENTS, ARCHITECTS




ENTRANCE DETAIL

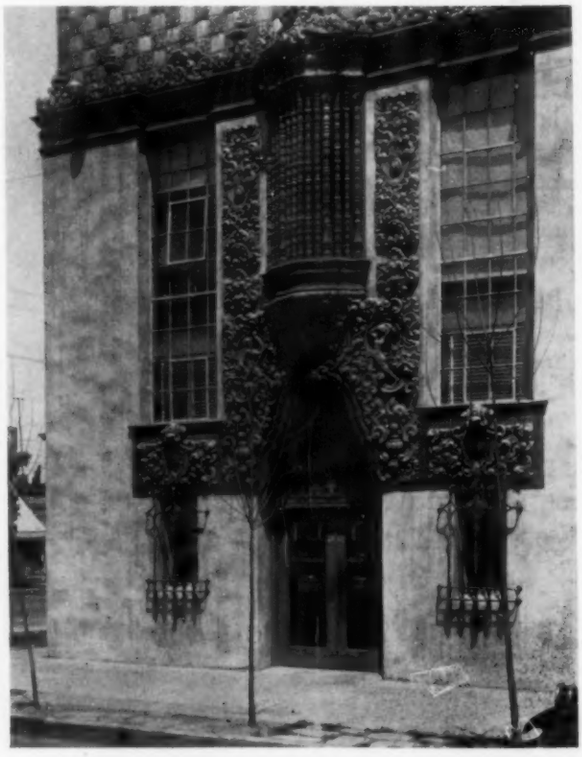


SAFE DEPOSIT LOBBY

UNION NATIONAL BANK, VENTURA, CAL.
MORGAN, WALLS & CLEMENTS, ARCHITECTS

*Photos. Mott Studios*

PERSPECTIVE VIEW



FRONT ELEVATION

BRANCH OF PACIFIC NATIONAL BANK, LOS ANGELES
MORGAN, WALLS & CLEMENTS, ARCHITECTS

# THREE BANKS BY WALKER & GILLETTE

THE designing of buildings for banks has long been met by architects with a frankly classical formula. Dignity and a certain quality of impressiveness that is always aided by marble columns have constituted a dual ideal, whether the specific rendering has been Doric, Ionic or Corinthian. The manner or technique has varied far more than the formula or objective, giving us banks of classic architecture, with (more recently) a few in Italian Renaissance, carried out with merit ranging from the finesse of McKim, Mead & White down to the crudities that can result from a total failure to understand the exacting nature of classical design.

Among the foremost designers of bank buildings, Walker & Gillette have long occupied a conspicuous place, and in their new building for the National City Bank at Broadway and Canal Street they have made skillful use of the new mode of architectural expression. On examining the exterior there is, first the unmistakable expression of dignity befitting a bank, and on closer study there is the discovery that a new kind of classicism has been achieved without having recourse to mouldings, to columns, or even to a cornice. Nor is there any expression of the bizarre which such a departure might imply.

If there is any secret underlying the success of this unusual design for a bank building, it will be found in the excellence of all its proportions, in the fenestration and skillful handling of scale throughout. If this be "modernism" in architecture, any but prejudiced critics must see in it the solution of much of the design of our modern commercial buildings, and must see, also, evidence of that escape from over-used conventions, from outworn architectural forms so long predicted but so many years in coming. There were those, years ago, who looked forward to a day when the too-familiar elements of architectural design might be jettisoned, —but no architect came forward to show how this might be done with more gain than loss. Louis Sullivan did what he could, and, after him, Frank Lloyd Wright, but neither achieved a real substitute, and the Europeans, mostly, were too radical.

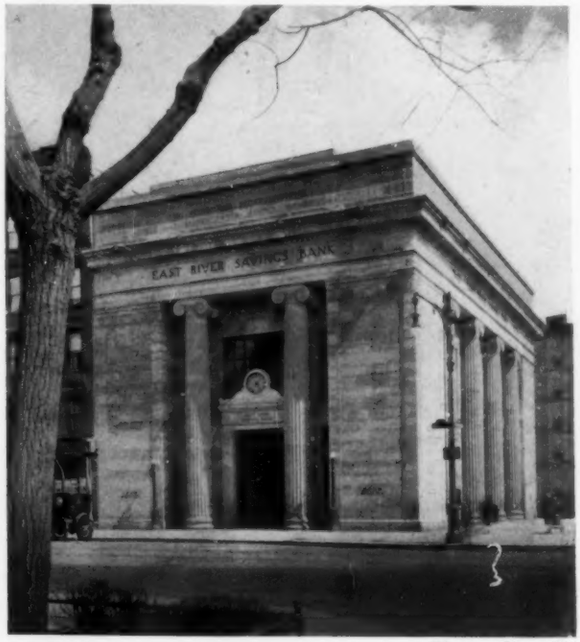
It is the excellent sanity of this new bank building by Walker & Gillette that makes it definitely one of the most significant buildings of the year,—sanity and dignity expressed by means essentially novel. It has been awarded Second Prize among buildings of the year by the Downtown League, and is likely to grow in importance as our urban architecture develops toward new expressions. It stands at the turn of an era, and is one of those buildings, forerunners of a wide change, from which later work is dated. Writing in 1940, critics may say: "The prototype of much of our present architectural design, one of the first well defined examples in which a successful departure was made from the classic, is seen in the building done by Walker & Gillette for the National City Bank in 1928."

This building, within, is no less unusual. The conventional treatments of walls or ceiling have been followed. Instead of pilasters, wall intervals are marked by vertical grooves, without base or cap, and with no projection from the wall surface. These perform the same function as pilasters without in any way being pilasters, and illustrate again


*Photos. Sigurd Fischer* *Plan on Page 894*

Branch of National City Bank, New York

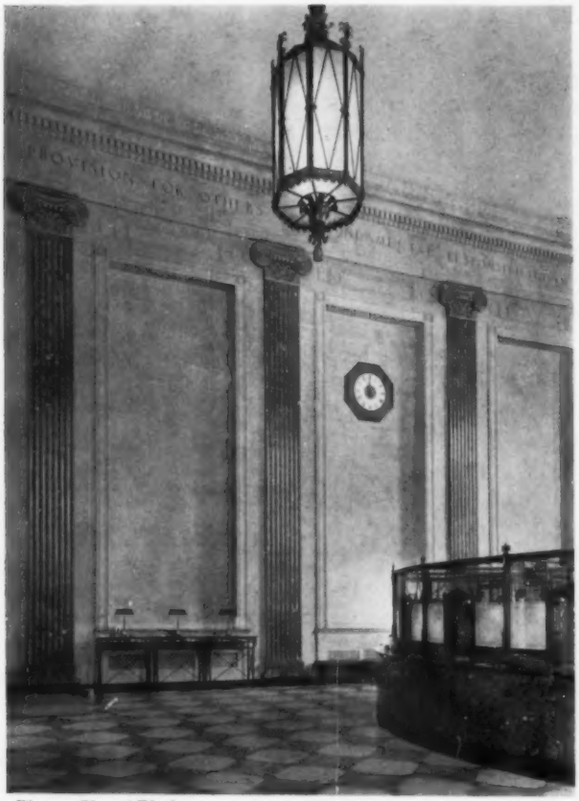
Walker & Gillette, Architects

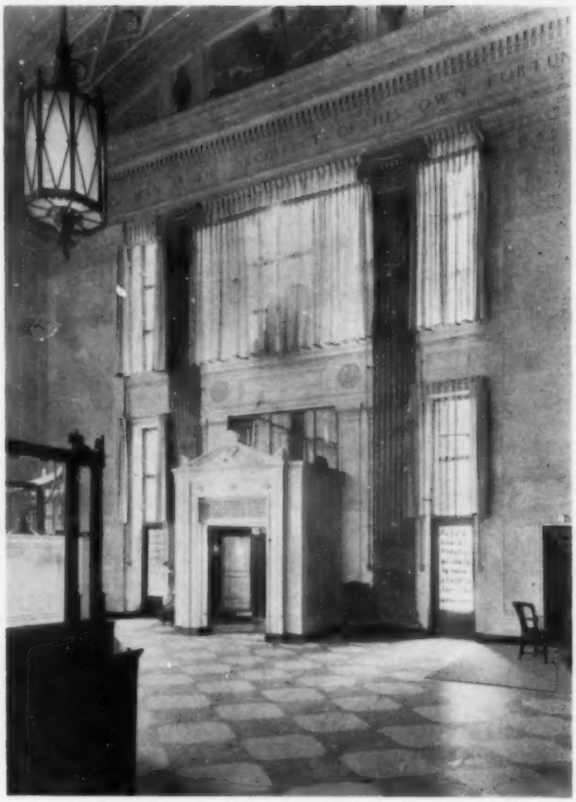



*Plan on Page 894*

East River Savings Bank, New York

Walker & Gillette, Architects



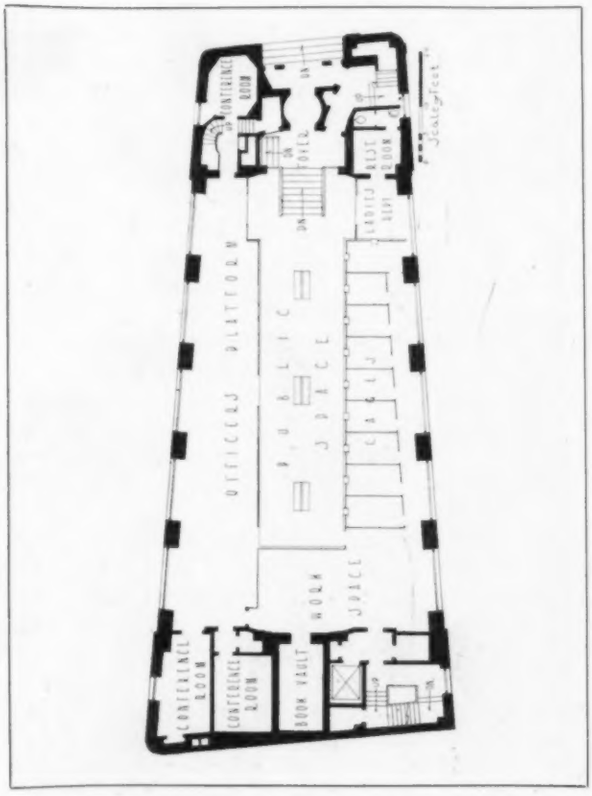


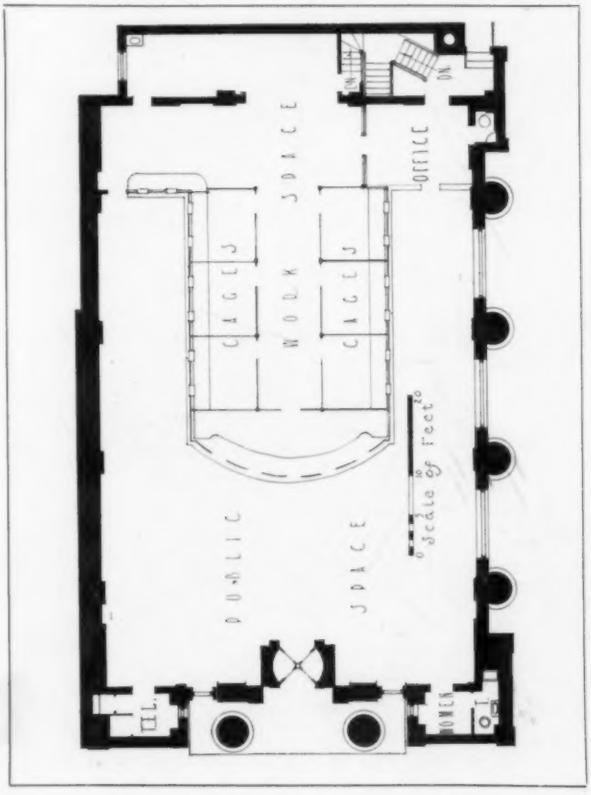
*Photos. Sigurd Fischer*

BANKING ROOM INTERIOR, TOWARD ENTRANCE

EAST RIVER SAVINGS BANK, NEW YORK

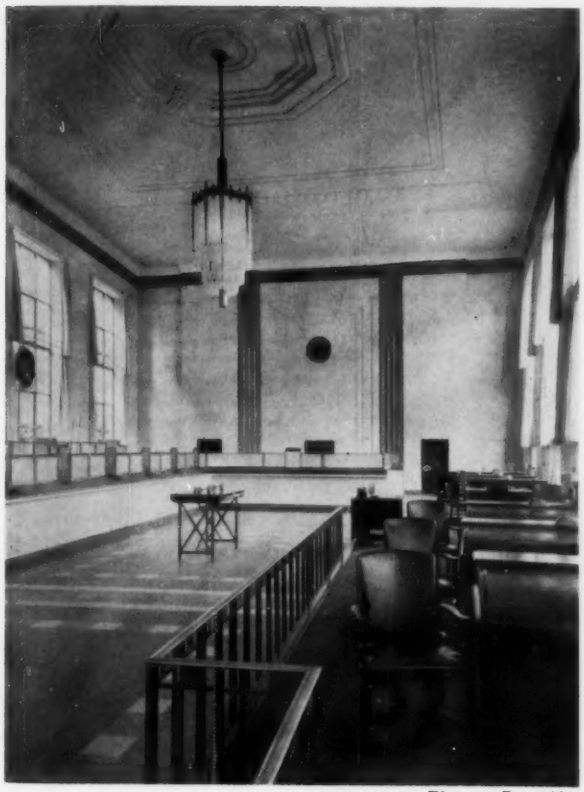
WALKER & GILLETTE, ARCHITECTS



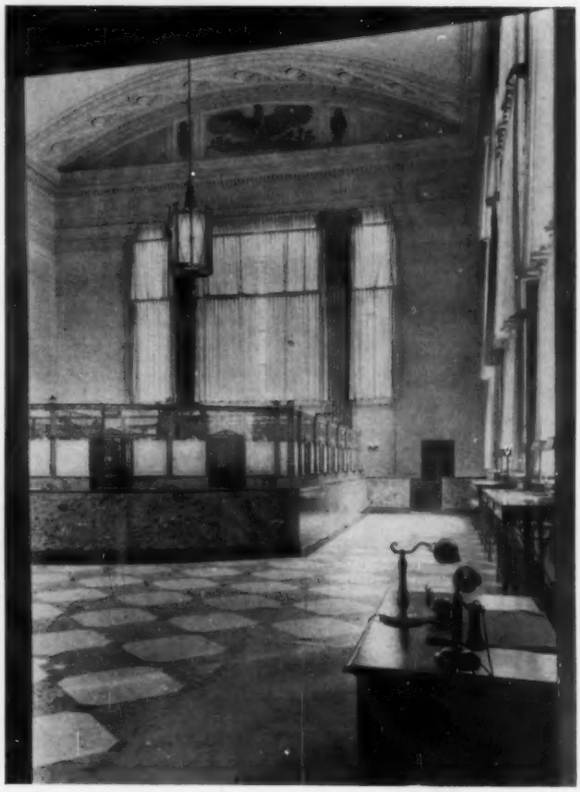

PLAN, BRANCH OF NATIONAL CITY BANK

PLAN, EAST RIVER SAVINGS BANK



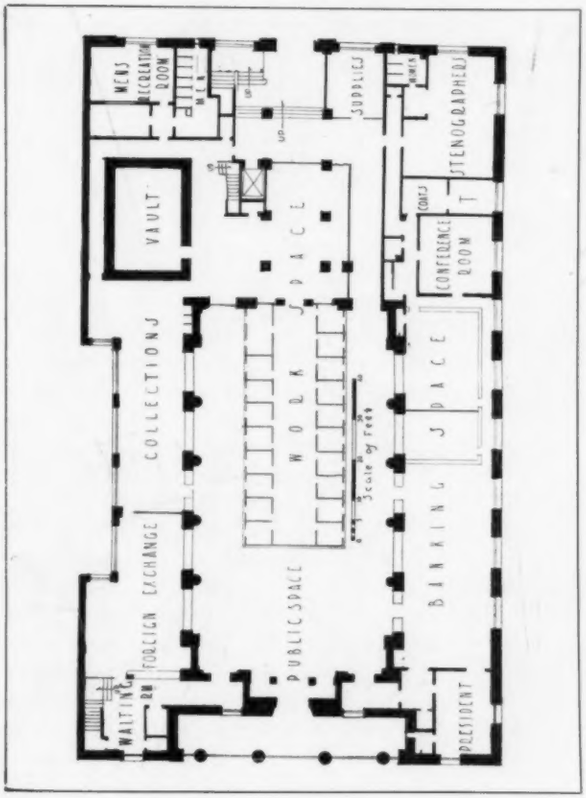
*Plan on Page 894*

BRANCH OF NATIONAL CITY BANK
WALKER & GILLETTE, ARCHITECTS

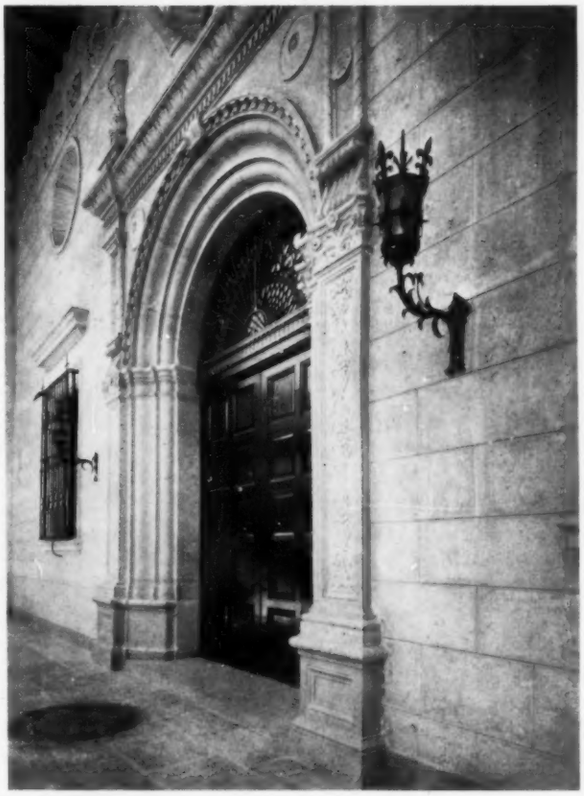


*Plan on Page 894*

EAST RIVER SAVINGS BANK
WALKER & GILLETTE, ARCHITECTS




PLAN, BRANCH OF NATIONAL CITY BANK, HAVANA



BRANCH OF NATIONAL CITY BANK, HAVANA
WALKER & GILLETTE, ARCHITECTS

*Photos, American Photo Studios*

Banking Room

*Plan on Page 895*

General View

Branch, National City Bank of New York, Havana

a remarkably successful departure from use of conventional forms. The ceiling decoration is in very flat relief, developing a pattern strikingly unlike that of the usual ceiling. The fittings are of silver and gun metal, and the entire effect of the great banking room is as restfully dignified as it is thoroughly unusual. An interesting aspect of this design for the National City Bank is found in the studied adaptability of the type for branch bank buildings in all parts of the world. The architects definitely intended to create a type for a bank building that would accord with the local architecture of varied lands and at the same time be recognized at a glance as of the National City.

Walker & Gillette's treatment of their design for the East River Savings Bank is of another sort, and at first glance seems to be another addition to our already numerous classic versions. It is not, however, of such obvious derivation, but is carefully designed in the manner of the Classic Revival of 1840 or thereabout. That period made the most of all the conventional classic forms,—columns, pilasters, Greek frets and anthemions. It was more classic than the architecture of Greece itself. It is curious that the manner of the Classic Revival has not been seen more often in current adaptations, especially in buildings of this sort. It lends itself well to the expression of dignity,—many stately residences of the period looking, indeed, more like banks than dwellings. Its adaptability in scale also commends it, for it can be made to assume bold or monumental proportions for the exterior and any degree of reduction for the interior.

In the East River Savings Bank the architects have shown due appreciation of this adaptability, and have achieved an interior excellently in accord with the best traditions of the old New York architecture of the Classic Revival. A conspicuous detail is the design of the tall pilasters of verde antique marble, and it is interesting to compare these with the non-stylistic grooves in the interior of the National City Bank. It may well be that the modern trend in design is coming to put all historic precedent in the discard; it will be interesting to watch its course. Meanwhile, for those who still look to historic derivations, this East River Savings Bank cannot but afford a valuable suggestion for the revival of the proud old style of the Early Republic.

Before the development of this international, non-stylistic kind of design for National City banks throughout the world, a bank building for Havana was planned by Walker & Gillette. The manner they chose was a version of Spanish Renaissance, rather bold in scale, the building being a large rectangular mass with the entrance in a loggia treatment of four Renaissance Corinthian columns. This entrance is the feature of the exterior, and was appropriately designed with a screen of wrought iron in the Spanish manner. Iron grilles protect the lower windows, and the roofing of Spanish tile gives further "local color." One interesting observation on the choice of style is the notation that when local architects, especially in Latin America, design an important building they generally turn to the French type of the Beaux Arts of the 1890's. In other words, they depart from their own logical local precedents, whereas when architects from, for example, the United States, are commissioned to build an important building in any foreign country, their first thought is to design in a manner locally appropriate. The interior of the National City Bank in Havana consists of one large banking room, with high clerestory windows and an interesting ceiling. The various private offices are disposed in a mezzanine and on the main floor, clear of the banking space, in a way not to detract at all from its sense of spaciousness. The architects have combined a practical and effective plan with a well mannered architectural treatment.

The New York architect is frequently called upon to design banking premises which are to occupy some portion of the street level floor of a large general office building. Denied the opportunity to achieve a large effect, our architects wisely, and for the most part ably, direct their efforts towards nicety of detail. They design a good looking entrance, with as much window treatment as the bank frontage allows, and concentrate as much effect as possible in the interior.

"FINANCE AND CONSTRUCTION"

FROM A LITHO-PENCIL SKETCH BY M. GOGOIS

*The Architectural Forum*

THE
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# BANKING SCREENS

BY

CHARLES A. HOLMES
OF HOLMES & WINSLOW, ARCHITECTS

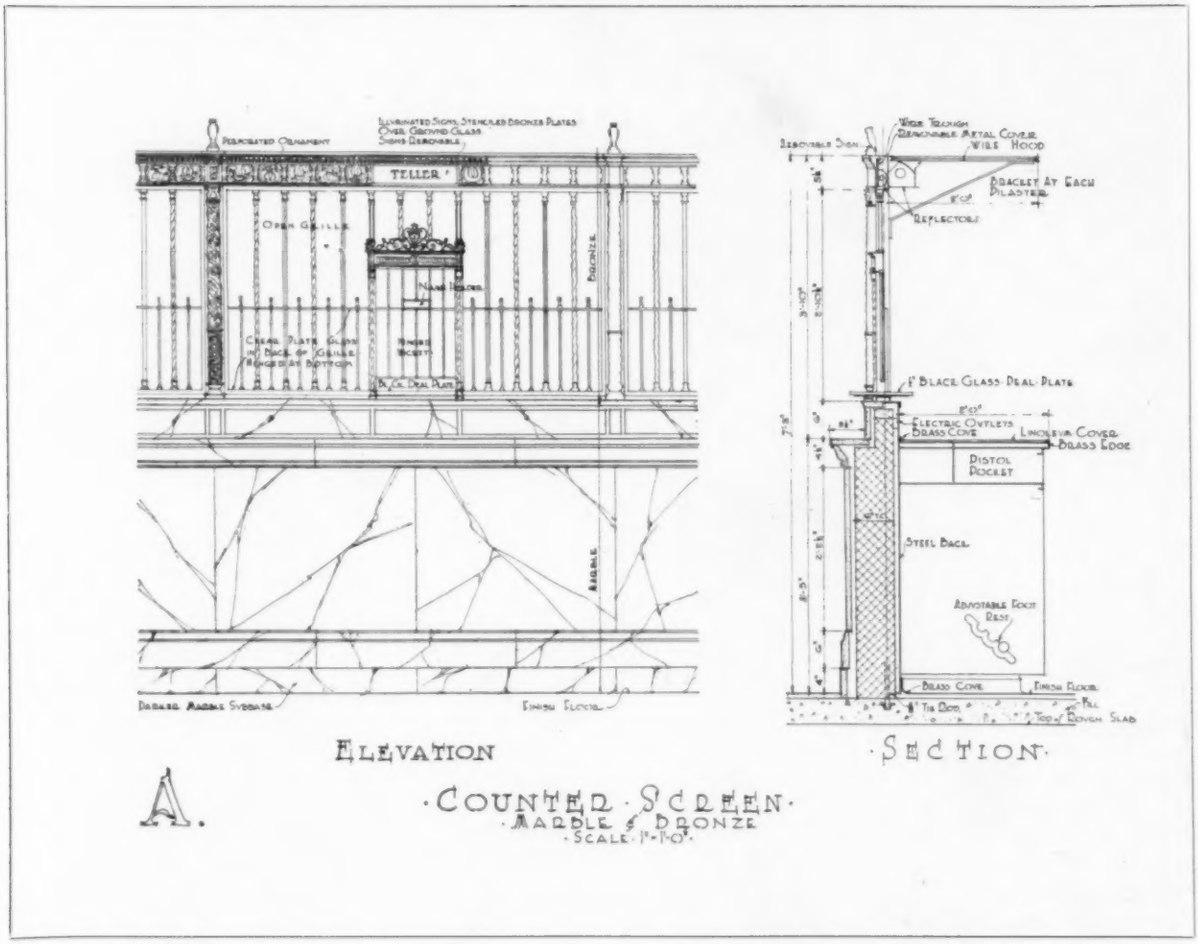
THERE has been, in the past two or three years, a decided trend in favor of discarding the high banking screen for a type of low banking counter, as depicted in illustration "F", and insofar as we are concerned, it has been the bankers themselves who have seen or heard of this type of counter who have insisted that it be used, or at least strongly considered. It was our first thought that, from an architectural point of view, the high screen was a necessity, but since we have carried out recently quite a number of banking rooms with the low type screen, I must confess that in my judgment, it does not in any wise affect the architecture of the room adversely, but does open up the quarters, securing a better appreciation of the merits of the room itself. We have shown in illustration "F" a counter that has been built several times by ourselves, and it is highly thought of by the bankers using it.

The normal height of the ledge and working counter is 41 inches, and we have arranged the upper ledge (that is, the ledge over which the money or pass book is handed) 10 inches higher, although in some cases this is only 7 or 8 inches over the counter. We keep it the 10 inches so that the tellers may have a practical space between the working counter and the upper ledge for storage of change machines or for the protection of stacked bills, etc. We believe, however, that should this low type be used, there should be at least one low wicket, that is a wicket the bottom of which is not over 41 inches from the floor as we have shown. This will be found a necessity for the use of small children who have recourse to a bank without their elders. The backing of the low counter should follow the high type of screen in regard to arrangement of cash drawers, cupboards, etc. The lighting of the low counter is effected by a continuous reflector just under the upper ledge, but set back in the corner as shown in the section of illustration "F."

Most banks insist on cages for the individual departments, and we have provided a low cage of metal (although it may be of wood or wire) with the solid portion extending up to the top of the marble ledge with glass (preferably clear plate glass) from the ledge to the top line of the bronzework. This will give the teller, we believe, sufficient security. Of course, a locked gate is provided at the rear of the cage. Building and loan associations, however, do not usually require cages for their tellers, and the low type of counter is especially adaptable to them. I am honestly of the belief that we are only seeing the beginning of this practice in this country, and that the more bankers become familiar with it the more general its use will become. Practically all bankers are talking about it, particularly if they are about to build new quarters. The idea of low counters for banking originated in Europe, and is much in vogue there. It has been suggested that with the low type of counter, the bank is more exposed to the danger of daylight hold-ups, but we believe this will work out in practice in just the opposite way, for if a hold-up were attempted it would be observed by every employe of the bank, and some employe not in the line of danger would be able to either fire a shot at the marauder or at least release the burglar alarm, the latter being what the robber most fears, almost without exception.

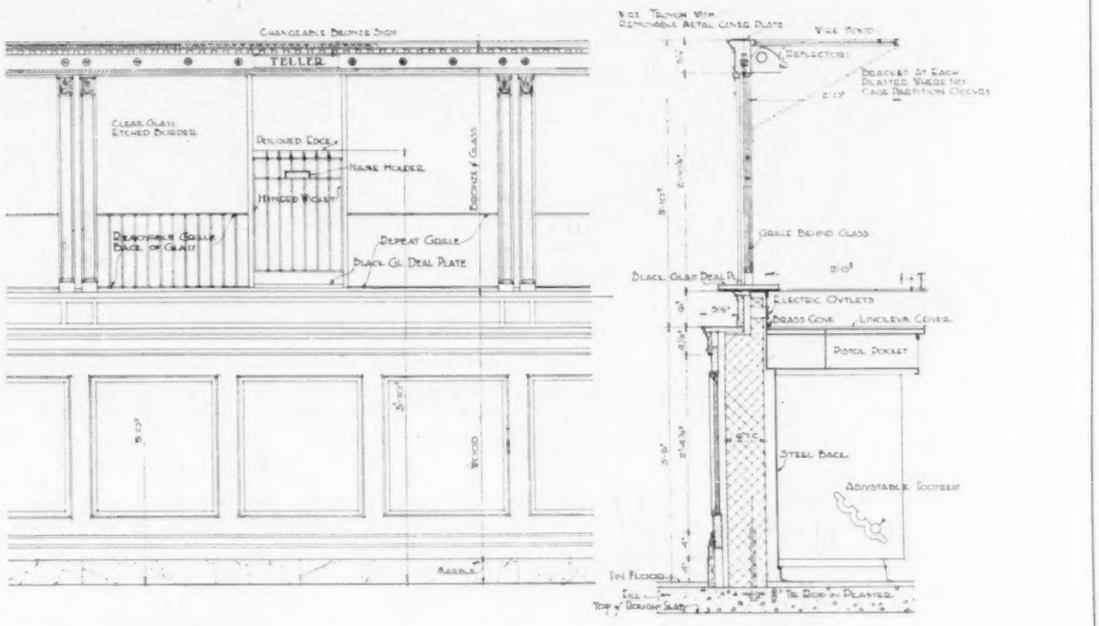
The one important attribute of this type of screen or counter, and the one large factor in favor of its ready adoption by bankers, is the personal banking idea it makes possible,—the close contact between depositor and teller,—and the further carrying out, behind the screen, of what at present exists between the officers and the depositor,—that close, personal banking idea without which any bank must expect to eventually fail, and which most banks encourage.

We show in the cuts accompanying this article, five types of high screens of sufficient diversity, and I believe that the individual designer may vary any type to conform to his own ideas. These screens are all practical and have been constructed, with variations, many times by our firm in various bank buildings. The first scheme, lettered "A," is the most likely to be required in a high class banking room, owing to the selection of fine materials,—marble for the lower part, or "die," as it is called, and bronze for the upper portion. The tile backing is the first portion erected, and while this is going




up it is built around 5/8-inch rods, the rods extending clear to the top, one rod to a column or pilaster. Then the marble facing is applied, and we think it well to have a darker marble for the sub-base. The bronzework follows the marble, and after the pilasters and cornice have been set in place there is a nut with washer applied to the top of each 5/8-inch rod, and the tightening of this nut stiffens and holds the screen in place. The screen if over 10 feet in length will, however, need greater stiffening, and that is accomplished by the cage partitions; if no cages are contemplated, a 3/4-inch rod from the top of the screen to the back wall may be necessary on approximately 10-foot centers. The counterwork at the back will not hold the bronze in place if no cages are installed. We have, in some screens where no cages have been installed, substituted a light T-iron for the rod and then stiffened the whole screen by a diagonal strut at the floor, being careful that the strut did not extend more than 16 or 18 inches out from the T-iron. This screen could have either high or low wickets at the option of the banker. Some sections of the country prefer what is known as the low wicket, that is with the deal plate level with the ledge and the counter back of it, while other sections prefer the high wicket as illustrated in this detail. The width of a wicket should be about 14 inches, and it is very important that the top of the wicket should not be too low. We usually make it not less than 5 feet, 6 inches from the finished floor, so that a person of average height will not have to stoop to talk with the teller. The "New Accounts" wicket in a savings bank should be anywhere from 2 feet to 4 or 5 feet wide, and we have installed them even wider in certain important instances.

Regarding glass in a screen of this type, it could extend from the top of the marble up to the first horizontal member, or from the top of the marble up to the cornice; or it could be eliminated altogether, whichever the banker might elect. Usually the glass is etched for the lower portion and clear above, or it may be, and sometimes is, clear throughout. We like to use an etched border on the glass to give it some distinction. A chipped glass may be used if preferred for the lower portion. No glass is used, of course, in the wickets. The bottom of the wicket must be kept 1½ inches or 2 inches above the deal plate, and wickets may be simply hinged, or as we sometimes make them, hinged and partially telescopic. Bankers, as a rule, are not roofing the wire cages all over, as they formerly did. Instead of this we install a continuous wire hood at the top of the screen about 2 feet wide. This is supposed to prevent a thief from making a hasty jump over the



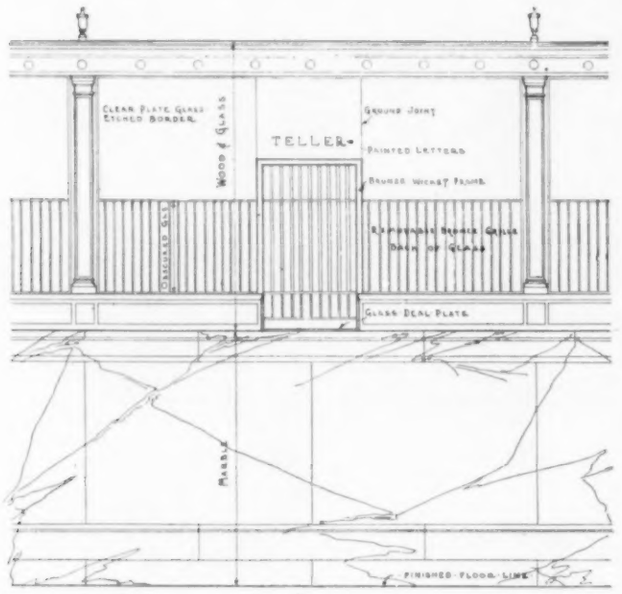

screen by stepping from the ledge. While a present-day thief hardly ever attempts this, it at least gives a slight feeling of protection to the teller.

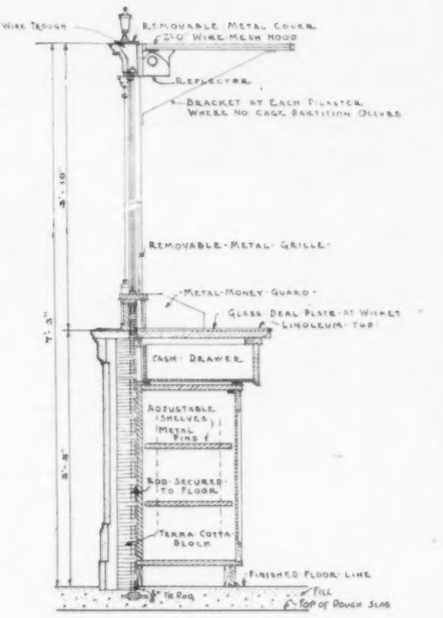
The lighting of the counter from the screen is most important, and we provide a continuous reflector at the top and the back of the screen for this purpose. It should be arranged to light up in bays, with a pull chain back of each pilaster. The reflector should have a diffusing glass on the bottom to reduce the glare. It can easily be arranged so that this reflector with additional parts may be used to light the banking room by throwing the rays up to the ceiling. The reflector may also be used for lighting the sign in the frieze of the cornice, or a separate small reflector may be installed for the sign, as shown in the illustration. At this point it may well be said that no two banks require the same designation of wickets, and that each banker must be consulted to determine just what he requires.

In the selection of the marble, see that a sound marble is used, either domestic or imported, one that will require very little waxing, for the wax generally falls out after a year or two, producing unsightly work. If a highly veined marble is used, it should be backed up with a cheaper American marble. The color of marble selected should depend upon the color scheme of the room, but we strongly prefer a one-color marble that is without much veining, and one that is soft in color and rather unobtrusive.

The ornamental work of the columns, pilasters and cornice of the screens shown in illustration "A," are cast bronze, while the plain portions are extruded. It is much more reasonable in cost if the cornice, for instance, is of extruded bronze with the cast portions applied, instead of the whole cornice being of cast bronze. The vertical bars in the illustration are of stock hollow shapes, a plain square bar set on the diagonal, and every other one twisted. These bars also have small and simple cast bronze caps and bases. The upright bars in the wickets are also of small, stock hollow shapes. The finest effect in cast bronze work is obtained by what is known as "lost wax casting," and such a casting is depicted in the illustration of the banking screen in the Federal Trust Company, of Newark, designed by Dennison & Hirons (p. 904). In ordinary bronze castings it is not possible to obtain any undercutting, but any degree of undercutting desired is possible with this process. It is very much more expensive to produce than the ordinary castings, however, owing to the fact that the wax model is destroyed in the process of casting and that instead of one model's serving for countless numbers of similar pilasters or other ornaments, a separate model is required for each column, pilaster or other ornamental feature.

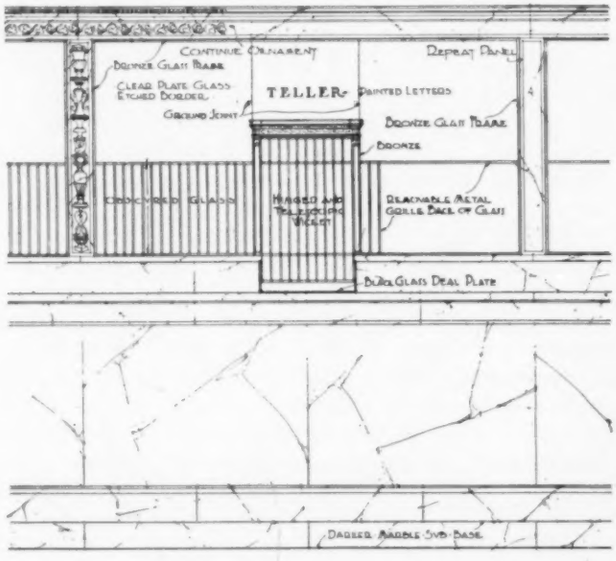
There are many methods of designating the wicket. In screen "A," it is shown in the cornice, the letters being perforated on a bronze plate with ground

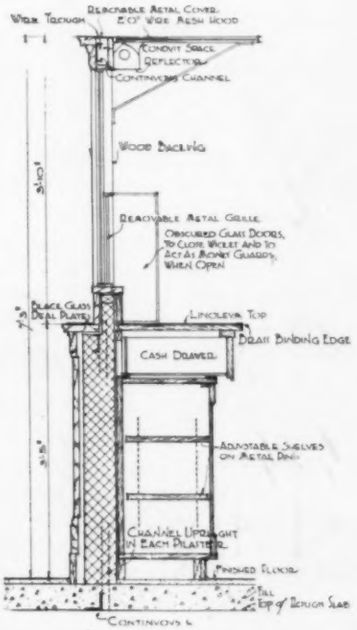



ELEVATION SECTION

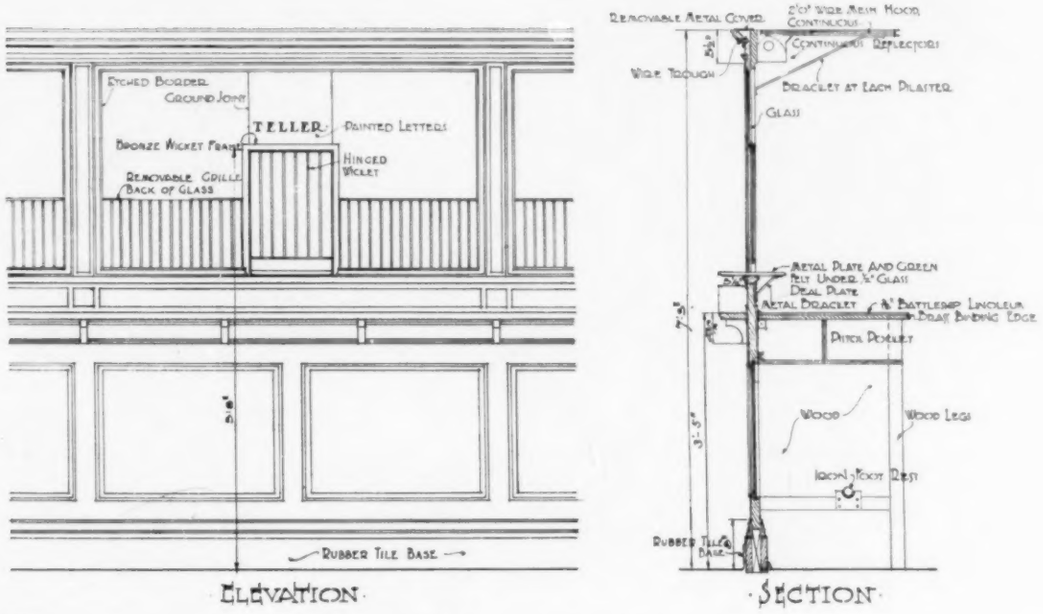
C. COUNTER SCREEN
WOOD & MARBLE
SCALE 1"=1'0"



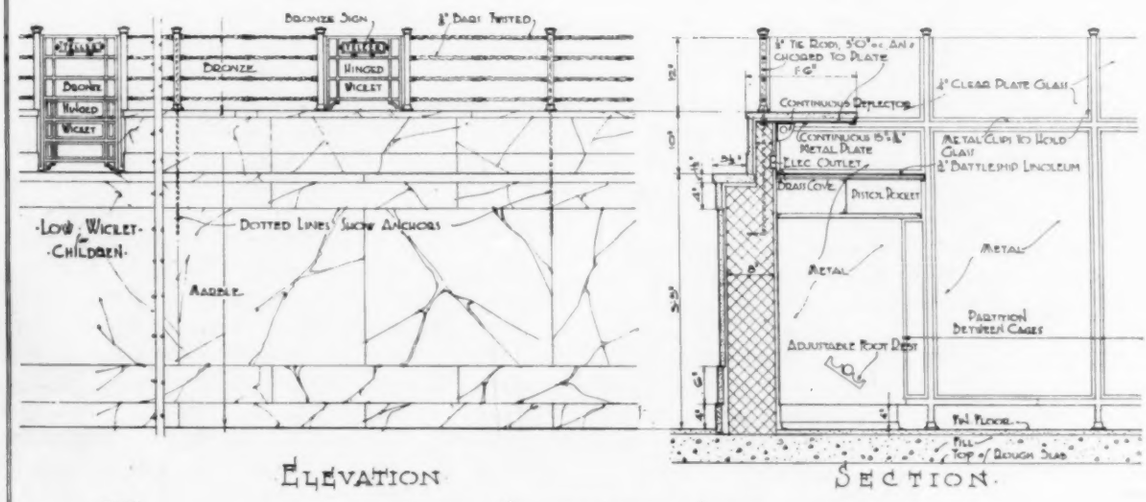

ELEVATION SECTION

D. COUNTER SCREEN
MARBLE
SCALE 1"=1'0"



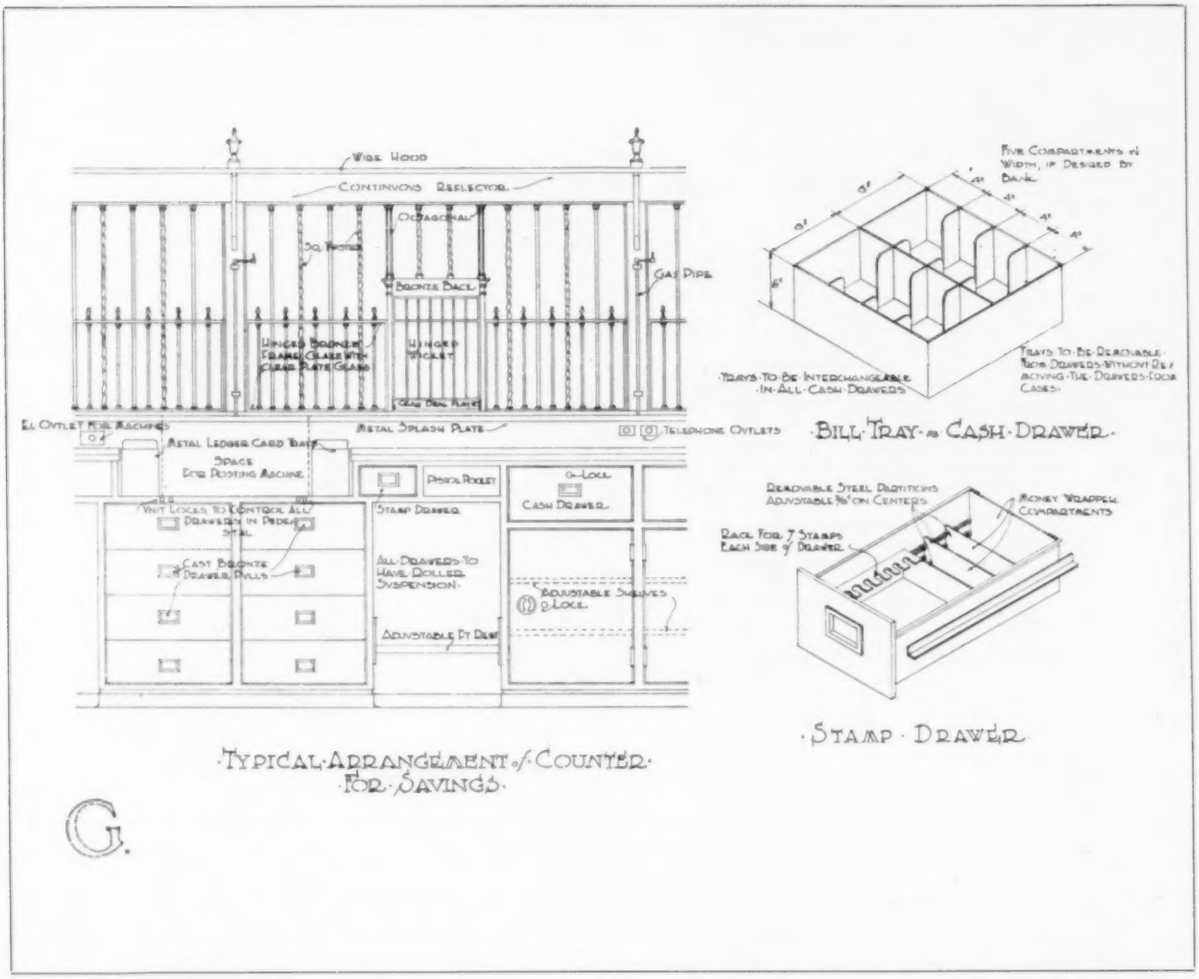

ELEVATION SECTION

## E. COUNTER SCREEN
WOOD
SCALE 1"=1'0"




ELEVATION SECTION

## F. LOW COUNTER SCREEN
MARBLE & BRONZE
SCALE 1"=1'0"

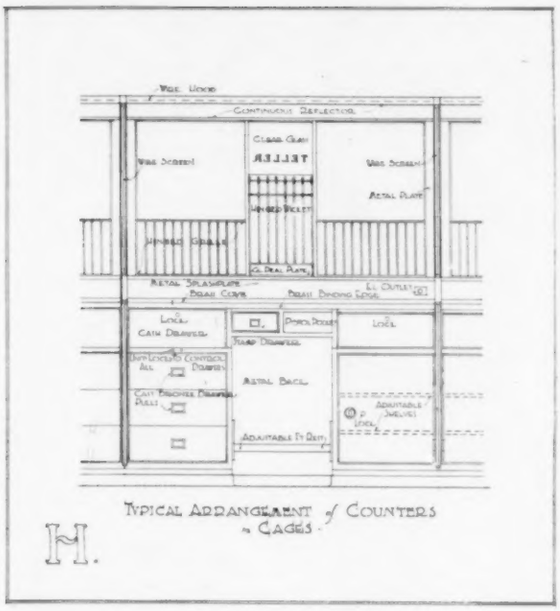


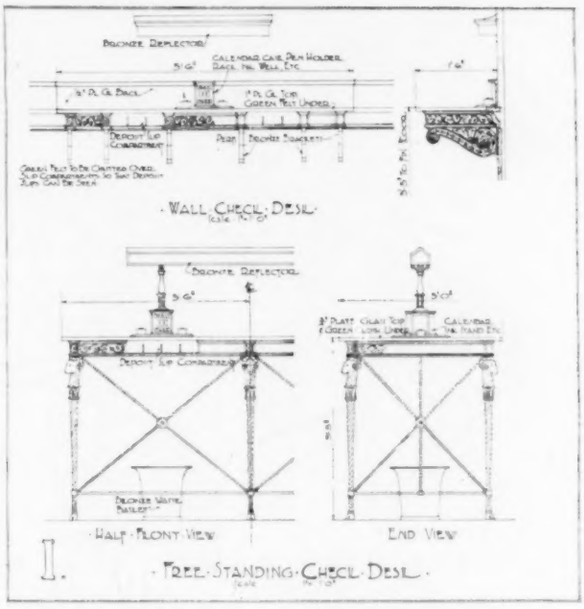

G.

glass back of it, and a small reflector to illuminate it. We always construct these signs so that they are interchangeable. It is also possible to have the same kind of an arrangement in the small cornice just over the wicket, but the letters would of necessity be smaller. There is still another method in which the sign stands out from the frieze of the cornice at right angles to the cornice. It may be either illuminated or not, as desired. The simplest and least expensive method, which is just as efficient, is the painting of the letters on the plate glass in gold with black edging (to make them more easily distinguishable) just over the wicket. If the plate glass of the screen is made up in three sections to a bay, as we have shown in several of the cuts, these also become interchangeable. The plate glass, if completely filling the entire space between the marble and cornice, should be made up in three vertical sections with a ground joint between the sections, or a small plain or ornamented bronze section could be introduced to cover the joint, such is as shown in illustration "B." In earlier banks it was the custom to have one large sheet of plate glass with only a cut-out for the wicket, but the banks were usually forced to replace the glass very often, due to breakage caused by settlement in the building, or to a heavy jar or impact or else to some other vibration.

We have found some bankers who wish to get away from the cold appearance of marble in a screen, and we have shown in illustration "B" a screen of which the lower part is wood. If richness is desired, it should be either mahogany, walnut or oak finished in soft tones. It could even be of wood painted, but unless the bank wishes to keep renewing the finish, it should be of the stained hardwoods, as just mentioned. It will be noted that this screen is constructed in the same manner as screen "A" except that wood is substituted for marble, and that another design of bronze upper screen is shown.

One illustration on page 904 shows a method of providing for a telephone to be used by two adjoining tellers. It shows a device that revolves and has a system of upright bars which always close the space between the cages, no matter which teller is using the telephone. Immediately under the telephone is a pass basket. The latter is an absolute necessity between the cages. There is also shown a detail of another type of pass basket, called a "tilting basket." We find this takes up much less room in a cage, where space is always at a premium, than the old type of wire pass basket that projected at least 5 inches into the cage on each side.



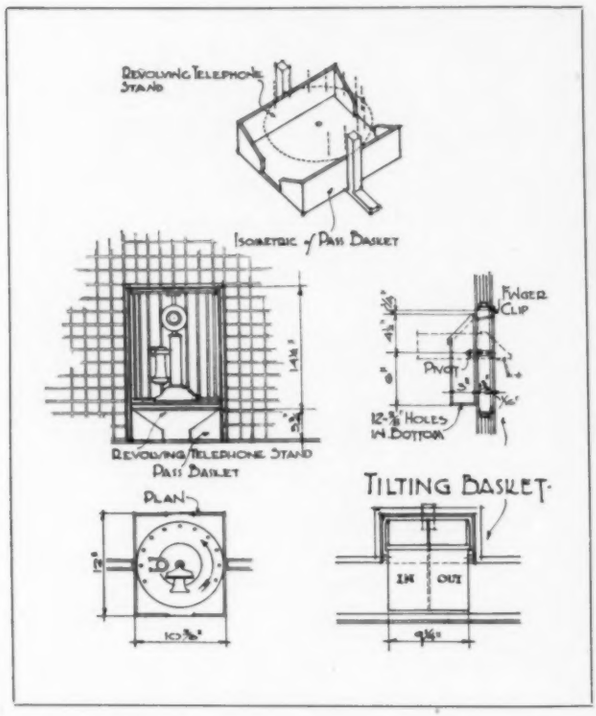




In illustration "C" is shown a modest cost screen with marble for the lower portion and wood for the upper part. We have shown this screen backed up with 4 inches of brick or tile rather than 6 inches. We do not believe the backing should ever be of less than 4 inches, and it is never necessary, in our opinion, to make it more than 6 inches, except where the low type of counter is used. This illustration shows a low wicket, and when low wickets are supplied for a screen, a bronze or baked enamel plate, approximately ⅛ inch in thickness, should be supplied for each side of the wicket on the counter side, so as to prevent anyone so inclined from fishing through the wicket with a wire for any bills exposed on the counter. A better but more expensive money guard than this may be provided by having two hinged glass doors in small bronze frames, (as depicted in illustration "D"), which when open will act as the proper guards, and when closed will show that the wicket is not in use. On the glass may be lettered in gold the word "Closed." There are various means used to indicate that a wicket is closed, and a simple and inexpensive method is to have each wicket supplied with a thin mahogany panel (with a small brace on the back) on which the word "Closed" is lettered in gold. This panel should extend from the top of the deal plate up to the top line of the protecting grille back of the glass and should be the full width of the wicket opening.

In illustration "D" is shown a complete marble screen. The pilasters and cornice may or may not be carved, according to the taste and importance of the bank. It is necessary, for the support of an all-marble screen, to have a channel iron frame instead of the rod uprights required for the other types. Two-inch or 2½-inch channels may be used, one for each pilaster, extending from the floor to the cornice, with similar channel sections, one running horizontally just below the ledge, and the other at the cornice line. On account of the weight of the material and to get proper fastening, the channel frame should be used.

Inasmuch as we have shown a low wicket in this scheme, a word about the deal plate would not be amiss. We usually supply deal plates in black glass, hone finish, as this type of glass lessens the strain on the teller's eyes. It is ½ inch in thickness and extends, in one piece, from approximately 1 inch from the front edge of the ledge to the back line of the counter. It should be countersunk so that it will project only 1/16 inch above either the marble ledge or the linoleum on the counter top. It also should be the full width of the wicket opening. One-half-inch plate glass with black billiard cloth stretched neatly under it, may be used in lieu of black glass if desired. The deal plate for the high wicket shown on several of the schemes is of similar glass, the full width of the wicket, but about 10 inches in depth. In illustration "E" is an all-wood screen which is the most reasonable of all, in cost. No channel iron frame nor rod uprights are necessary. If cages which would give the screen stiffness are not to be installed, light rods will have to be run from the cornice back to the wall, or some other means must be devised to hold the screen properly in place. This type of screen may be constructed of any hardwood desired. It will be noted that we have supplied a ledge even for this screen, because we believe a ledge necessary, not only to afford a place on which to write while standing in line, but for the general comfort and convenience of the patrons as well. It will improve this type of screen if a bronze glass mould is used to hold the glass in place.

We have shown in these illustrations two schemes for the counter work, one for a business bank and




*Left.* Telephone Stand with Pass Basket Between Cages

*Right.* Tilting Pass Basket Between Cages

Bronze Bank Screen for Federal Trust Company, Newark

Dennison & Hirons, Architects

one for a savings bank. That for the business bank shows two pedestals (as the compartments at either side of the teller's leg-room are called), to a cage, although we have many banks that have only one pedestal; the equipment we have shown we believe is complete. We usually make the two drawers on either side of the wicket interchangeable, as tellers have distinct preferences in the matter of placing the cash drawer on the right or the left side. The knee space should be ample and not less than 20 inches in width. We usually arrange a rubber stamp drawer (as shown on sheet "G"), and also a pistol pocket just under the counter at the knee space. On the floor, in the knee space, should be the rod for the burglar alarm daylight hold-up system. There should be one rod for each teller, although in some instances we have installed fewer.

A typical metal cash tray that fits easily into the cash drawer is shown in illustration "G." This should be either four or five compartments wide and two sets in depth. When four are used, the teller places the $1 and $2 bills in one compartment, and the others are for $5, $10, and $20. The cash drawer, whether of wood or metal, should be hung on ball-bearing extension hangers, so that the back compartment may be readily used. There should be numerous base receptacles and telephone outlets in the "splash plate," the vertical space between the top of the counter and the beginning of the grille.

Illustration "G" shows the counter work necessary for a savings bank, and shows a sinkage in the counter for the posting machine, used by a savings bank, with space at each side of the machine for card trays. It is much more practical and makes a better looking counter in every way to arrange for the posting machine in this manner rather than have it set on the top of the counter. Sheet "I" shows a free-standing check desk and a wall check desk, both of which may be varied or simplified as the designer wishes. Both types must have slip compartments, a set of four or five for each patron. If it is a free-standing check desk, a set of compartments should be on each side; but if the desk is long enough to accommodate six or eight persons while writing, at least four sets of compartments should be installed with either three, four or five compartments to a set. A wall desk, if only 4 or 5 feet long, should have a set of four or five compartments. The glass on top of the desks is never less than ½ inch and is usually ¾ to 1 inch in thickness and should be of plain plate glass with billiard cloth under it. It must be arranged, however, that the patron can see through the top of the slip compartments; in other words, omit the billiard cloth immediately over the compartments. Of course both types of desks must have good lighting facilities, reflectors preferred, and the necessary calendar cases with ink wells and pen trays, not to mention waste-paper baskets. The electric wiring for the lighting of a free-standing check desk leads from the reflector, is fastened to the under side of the desk, and then is carried through one of the legs down through the floor, terminating at a regular outlet box. At least this is the usual method of wiring it.

# MATERIALS AND COSTS OF BANK INTERIORS

BY
WALTER CHARLES VOSS
CONSULTANT IN ARCHITECTURAL CONSTRUCTION

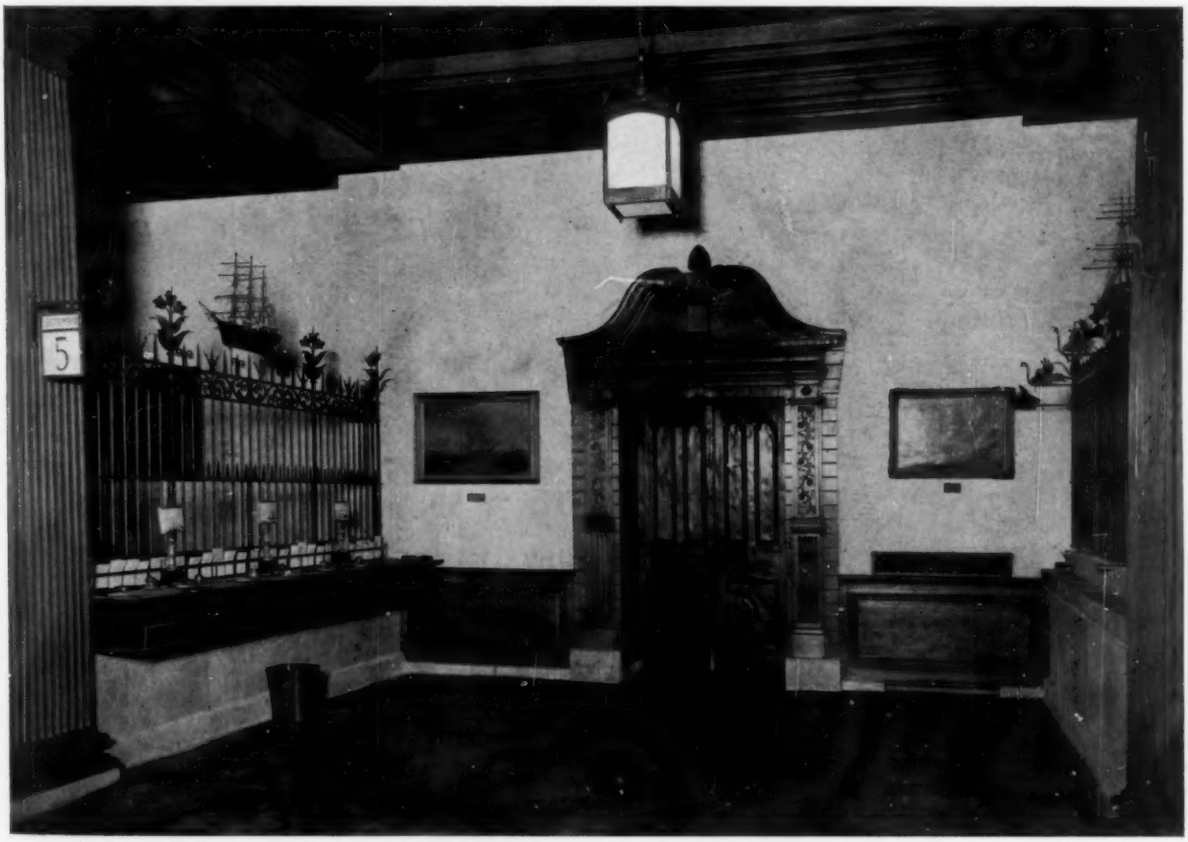
THE materials forming the interior floors, walls or ceiling surfaces of banking rooms may be divided into several basic classes for each of these elements of the structure. The *floors* may be finished in clay products, concrete, cork, linoleum, magnesite, natural stone, rubber or wood. The *walls* are usually finished in one or a combination of clay products, natural stone, plaster or wood. The *ceilings* may be finished in one or a combination of clay products, concrete, glass, plaster or wood, with painted or fabric finishes used in instances where desired. In most of these materials, interesting and pleasing effects may be obtained by a variety of colors, textures, shapes and sizes. *Durability and maintenance* costs are dependent upon such qualities as resistance to abrasion, fire, absorption and stains, and quality of workmanship. Variations in combinations of basic materials, as well as the selection of the material itself, will greatly influence character, and particularly costs. Many small units will increase application or installation costs, and irregular areas will increase cutting costs. At best, the values herein given are only general averages, intended as indications only.

## *Floors*

*Clay products* vary in size, shape, color, and finish. As such, they present the most adaptable materials which the architect has for floor work. They may be divided into two general classes,—quarry and mosaic. Maintenance for these floors consists chiefly in repointing of joints and replacing of damaged or worn units, and may reasonably be classed as very low. Cleaning is simply and quickly accomplished. The ultimate cost for these floors should probably be rated as average.

*Concrete* is used in pre-moulded units or is cast in place to pattern. The past few years have seen an unprecedented development in this kind of work which makes this product exceedingly flexible. Ordinary concrete floors are not advisable for bank interiors, unless previously marked to pattern and then stained.

*Terrazzo.* The most common cast-in-place floor is terrazzo. This is combined with brass separation strips to form pattern and shrinkage planes. Color is almost invariably obtained by exposed aggregate finishes, although many use metallic oxide pigments




An Effective Use of Wood, Plaster and Wrought Iron

Granite Flagging for Floors; Carved Pine Trim with Pine Paneling and Ceiling

in addition. Pre-cast tiles are made with terrazzo and patterned effects, and variation in shape is produced as freely as with clay tiles. The maintenance of these floors takes the form of patching of cracks or oiling and waxing, and may be classed as low. The ultimate cost to the owner should be considered average.

*Cork* is either a "tile" or a "carpet." It is made as a natural product or as a composition employing pigments, gums and oils which slightly vary both color and durability. It is practically noiseless. The tile are obtainable in a variety of sizes, shapes and patterns, and some of the carpets are manufactured in patterned sheets or rolls. It is naturally of a somber color. *Linoleum* is in reality a cork composition product. It is made in plain and inlaid patterns. Maintenance of these floors is a matter of replacement in worn or stained areas and should probably be classed as high where traffic is heavy. The floor areas which are public receive exceedingly heavy and wearing traffic in most banks. The ultimate cost of such material would probably therefore be high for such work.

Interesting Tile Floor and Dado; Moulded Plaster Paneled Walls and Ceiling

*Magnesite compositions* are usually plastics applied to structural floor surfaces, producing a seamless or a patterned effect. Their main interest centers in color variety. They are semi-flexible, and as such are reasonably quiet and comfortable. Maintenance of this type of floor will consist mainly of repairing cracks, and should therefore be low. The ultimate cost of this floor may also probably be considered low.

*Natural stone* is used as flagging or as tiles. The common varieties are marble, bluestone and slate, although in some instances granite has also been used. The effects produced are the result of natural color and grain, shape of unit and surface finish. The tiles or slabs vary from 7/8 of an inch to 2 inches in thickness, with the former dimension most commonly specified. Where bluestone and granite are used, the thickness of the flagging will be from 3 to 6 inches. Maintenance of this floor consists mainly in repointing and in replacement of broken or disfigured units, and will be low. The ultimate cost may be classed as high, due to the cost of the original installation.

*Rubber* as a material for flooring is made in patterned tile or runners, and is produced with variety in grain and color. It comes in plain solid colors or in variations that simulate marble; the latter do not show soiling easily. It is in reality a composition for the purpose of toughness. It is resilient, and consequently quiet and comfortable. Maintenance of rubber floors consists mainly in surface treatments and washing to remove grit and dirt. It would be considered very low. The ultimate cost to the owner may be classed as low.

*Wood* is used for bank floors rather rarely today, but when employed is usually in a parquetry or herringbone pattern. It is extensively used in the smaller rooms of banks, such as private offices and committee rooms. It is subject to the usual shrinkage and swelling common to wood floors and must be of thoroughly seasoned stock, carefully laid, to give bank service. Maintenance for these floors means constant attention to surface and opened joints, as well as to replacement of worn portions. This would make maintenance high. The ultimate cost would also be high.

### *Walls*

*Clay products* when used for wall decoration and finish are usually confined to dadoes and scattered faience tiles embedded in plasterwork. The decorative tile is customarily used. The natural characteristics outlined under floor tile apply here as well, except that resistance to abrasion enters only slightly into the necessary qualifications. Maintenance is

again a question of joints and miscellaneous replacement, and is very low. The cost of such dado work varies from 75 cents upwards, per square foot in place.

*Natural stone* may be the interior finish of the entire walls of a banking room, and if so used is constructed in the same way as exterior work. Limestone ashlar is most commonly so employed. Veneers are used as dadoes, and marble is the customary stone for this sort of work. Maintenance resolves itself to pointing repairs, and care must be exercised where limestone ashlar is used to provide protection against ink stains when counter desks are placed as a part of the wall furnishings. Interior ashlar work varies in cost from $1 upwards, and marble dadoes cost from $1.50 upwards, per square foot in place.

*Plaster* is probably the most common medium for wall finish and is used as an all-over texture finish, as a base for painting, murals and tapestries, and is often most ornamental in character. Plasterwork is also often made to resemble limestone ashlar, travertine and Caen stone. At times these effects are produced by pre-cast blocks of gypsum or other material, which are erected in the ordinary fashion as for natural stone. Color interest as well as texture may be obtained by the use of manufactured plasters. All-over or ruled plasterwork is more subject to the cracks resulting from settlement than either natural or artificial stone facings, and maintenance is required early in the life of the building to remedy these defects. Where expensive paintings or murals are used, the results of such cracks may often cause extensive repair bills. In most cases it is wiser to have mural paintings on canvas placed against the plaster, so that they will not be subject to defects that might develop in the plaster. All-over textured plasterwork will cost in the neighborhood of 60 cents per square yard; ruled or jointed imitation stonework costs about $4 per square yard; ornamental plasterwork will vary from $3.50 for panel and moulded work to $5 for heavily ornamented work, per square yard, over the average area; cornices cost about 35 cents per developed profile square foot, and mouldings average 35 cents per lineal foot, with each miter considered an additional lineal foot; pre-cast ashlar costs approximately $12 per square yard, which includes the base course; mural decorations will depend entirely upon the talent of the artists employed in their production. Ordinary painted plaster surfaces vary in cost from $1.50 to $2.50 per square yard, for plasterwork and painting.

*Wood* is often used to form paneled wall surfaces. In order to conserve the natural beauty of the wood, stains and wax or varnish finishes bring the tones of the room down to darker values, which may be objectionable in some banks. The common woods so employed are oak, chestnut, mahogany and walnut. The paneled wall is subject to shrinkage, and maintenance, at least in the earlier stages of the life of the building, resolves itself into refinishing. The wood must be kept alive by occasional refinishing and must be maintained for scars, broken arrises and such disfigurements. Paneling varies in price from about $1 to $3 per square foot, for average work, although much higher costs are entailed where carving is specified.

Walls of Pointed Ashlar and Ornamental Plaster; Marble Dado and Trim; Cork Tile Floor

### *Ceilings*

Where *clay products* are used, timbrel vault construction is commonly specified. These tiles are laid in a variety of patterns and colors. They present fire-safe and easily maintained surfaces requiring only washing to bring them to their original condition. Occasional painting may be required also. Such construction, when independent of the upper floor frame, varies in cost with the spans and the decorations desired, but amounts to about $2 per square foot of projected ceiling surfaces.

Plaster Walls and Ceiling; Marble Dado; Rubber Tile Floor

*Concrete* is being used extensively in the Far West for ceiling ornamentation. The beams, girders, slabs and even the columns are left rough as they come from the forms and are stained or painted to develop pattern, mosaic effects and endless ornamentation. The only surface cost in this case is the staining or painting, which amounts to about 30 cents per square foot as an average. Maintenance cost is negligible, as the surface of stained concrete is washable. When paint is used, the repairs must be made by complete replacement, when washing no longer serves to return the surface to its desired state. Concrete, in its original placing, may also be developed into reliefs, panels, and moulded ornament which take the place of the commonly used plaster ornament. Highly ornamented concrete ceilings, of course, increase the cost, directly chargeable to ceiling finish, but not as much as applied plaster ornament would, particularly where repetition of motif is possible.

*Stained and ornamental leaded glass* is used only where ceiling-light construction is feasible. This work may be carried out to a highly ornate and ingeniously lighted form, but in the usual instances will vary in cost from $2 to $3 per square foot. Maintenance cost in such cases is merely a case of washing or replacement of broken pieces and the repainting of supporting framework, and is moderate.

*Plaster* is most commonly used for ceiling finish, and the same finishes are used for walls, with one difference. The ceiling ornament is usually more profuse than the wall ornament, and moulded panels, coffer and stucco work are very commonly employed. The ceilings may be flat or vaulted, depending upon the effect desired. Ceilings of plaster are almost always painted with cold water paints, and redecorating, particularly where highly ornamental motifs and mouldings are used, is expensive. Plaster ceiling maintenance, if properly attended to, is by far the most expensive of all. The cost of reasonably plain moulded ceiling construction, painted, is about $4 per square yard; for coffered, vaulted or highly ornamental flat ceilings, the cost will average from $3 to $6 per square yard.

When *wood* is used in ceiling construction it is almost entirely confined to beams and mouldings, very often supplanting moulded plasterwork as an economy. These beams may be stained and finished to harmonize with wall paneling or may be painted in tones to match the ceiling plasterwork. The cost of such work will be about the same as for wall paneling, and the total area should include the circumferential exposed dimensions of the ceiling beams.

## MAINTENANCE AND COST OF FLOORS FOR BANKS

(HEAVY DUTY)

| BASIC MATERIAL | NATURAL STONE | | | TERRAZZO | | CONCRETE | |
|---|---|---|---|---|---|---|---|
| | Bluestone | Marble | Slate | Cast | Tile | Ordinary Stained | Pattern Tile |
| Resistance to | | | | | | | |
| (a) Abrasion | Excellent | Excellent | Excellent | Excellent | Excellent | Good | Good |
| (b) Fire | Excellent | Excellent | Excellent | Excellent | Excellent | Excellent | Excellent |
| (c) Absorption | Excellent | Excellent | Excellent | Excellent | Excellent | Good | Fair |
| (d) Acids-Alkalies | Good | Good | Excellent | Fair | Excellent | Fair | Fair |
| (e) Stains | Good | Poor | Excellent | Poor | Fair | Poor | Poor |
| Maintenance Req'd | Joints Oiling | Joints Replacement | Joints Replacement | Cracks | Joints Replacements | Oiling & Waxing Cracks | Joints Replacements |
| Maintenance Rating | Excellent | Excellent | Excellent | Excellent | Excellent | Good | Good |
| Approximate Cost Limits per Sq. Ft. | $1.00 up | 1.25 up | 1.00 up | .50-.75 | .80-1.25 | .40-80 | .50 up |

| BASIC MATERIAL | CLAY PRODUCTS | | CORK | MAGNESITE COMP. | | RUBBER | WOOD |
|---|---|---|---|---|---|---|---|
| | Quarry | Mosaic | Tiling or Carpet | Linoleum | Plain | | Plank, Parquetry |
| Resistance to | | | | | | | |
| (a) Abrasion | Good | Good | Fair | Poor | Good | Excellent | Poor |
| (b) Fire | Excellent | Good | Poor | Poor | Fair | Good | Poor |
| (c) Absorption | Good | Fair | Fair | Excellent | Good | Excellent | Fair |
| (d) Acids-Alkalies | Excellent | Excellent | Poor | Poor | Poor | Excellent | Poor |
| (e) Stains | Excellent | Poor | Poor | Fair | Fair | Excellent | Fair |
| Maintenance Req'd | Joints | Joints Replacements | Replacements | Waxing Replacements | Cracks | Washing | Finishing Repairs |
| Maintenance Rating | Excellent | Good | Fair | Poor | Good | Excellent | Fair |
| Approximate Cost Limits per Sq. Ft. | $.65-80 | .60 up | .45-.70 | .30-.40 | .20-40 | .70-1.00 | .40 up |

# THE LIGHTING OF BANKS

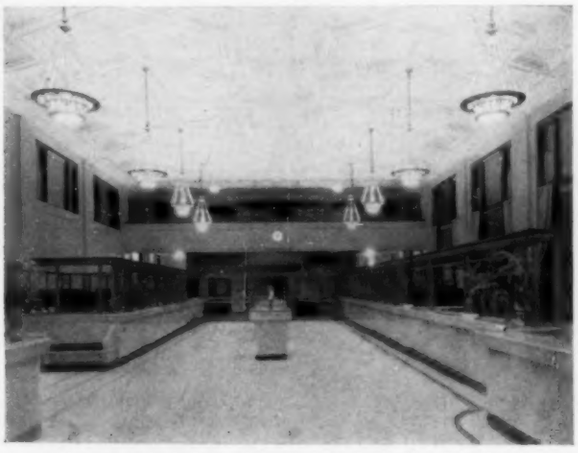
BY
WALTER STURROCK AND C. E. WEITZ

LIGHTING fundamentals, we are beginning to realize, lie deeper than any superficial standards set up in the drafting room of the engineer or the architect. Lighting is so intimately a part of ocular hygiene and conservation of vision that its use both in quantity and quality has been a subject of much study by the physiologist and research ophthalmologist. From these specialists the lighting engineer gets underlying facts which he, in turn, interprets in terms of equipment to provide illumination which meets the visual requirements. These underlying or foundational facts on how our eyes use light and how to safeguard vision have been learned only today, relatively speaking. The recent researches on light and vision give us a groundwork for practical lighting recommendations based on a more substantial foundation of facts than has been available heretofore. More has been learned about illumination, and more chapters have been written in the book of lighting progress in the last decade than have accumulated throughout all the periods of history.

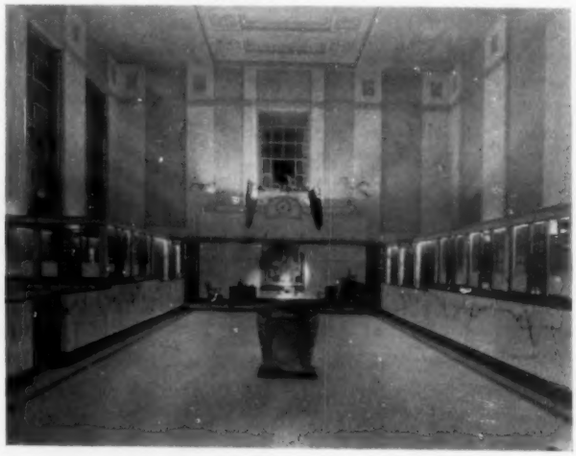
In large banking areas, where a great deal of study is given to the architecture, the lighting system becomes of primary importance, not simply to meet the demands for ocular work but as a part of the decorative design of the interiors. Fortunately, these two demands of a lighting system can be coördinated readily, so that no longer should we find in any new interior lighting systems which do not meet all the requirements. The general requirements for good illumination have been set forth in so many published articles that it seems everyone should know them thoroughly. Emphasis is always placed upon the avoidance of excessive brightness or glare, the elimination of heavy dark shadows, the desirability of uniform distribution, and, —particularly of late,—the physiological need for a greater amount of light than is ordinarily provided. These general requirements need no elaboration here.

*Choice of Equipment.* It goes almost without saying that the lighting fixtures employed in banks should be decorative and of pleasing appearance, both lighted and unlighted. The actual choice of equipment must depend on the character of the architecture, height of ceiling, color, columns, and such factors. Fixtures of the direct type add life and action to an interior and are the most efficient, but the system must be handled with care if the light is not to prove distracting and uncomfortably bright. Where exposed-lamp fixtures are desired to carry out a definite motif, it is well, where possible, to design the fixture around a central high-wattage diffusing unit to supply the main source of illumination, using small lamps merely to carry out the effect. Semi-direct or indirect equipment produces a soft, comparatively shadowless illumination, and may be designed to create an atmosphere of restfulness, stability, or severe dignity as desired. Lighting from equipment concealed in urns, wall pockets, or coves is pleasing, since it emphasizes architectural detail and seems to expand the dimensions of an interior. Supplementary decorative wall and column brackets, well shaded, add a touch of color and life. In all applications requiring a sufficient amount of light to permit comfortable working vision, the trend is distinctly away from lighting fixtures of the multi-light chandelier type as the primary light source. Such fixtures have some decorative significance, but they are relatively inefficient, and unless mounted very high, are usually sources of glare.

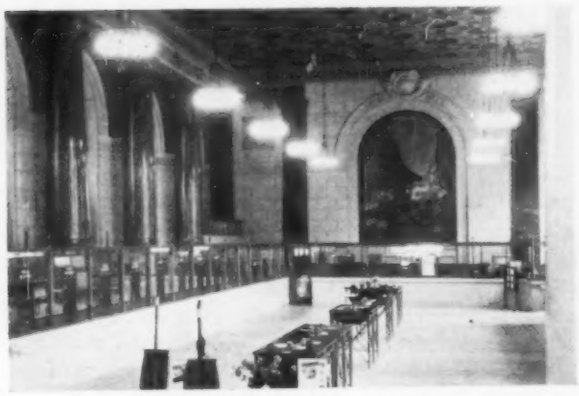
With these brief comments, let us leave the matter of fixture type for a moment and consider the



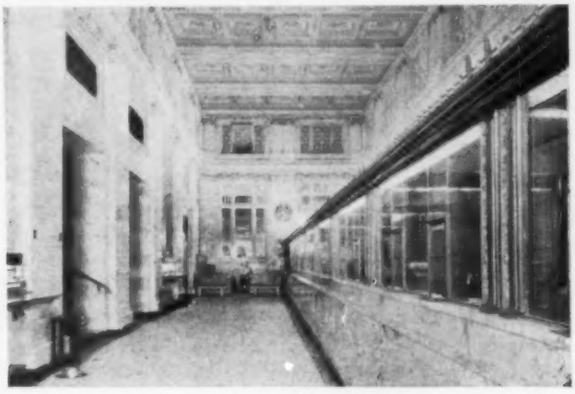
Pleasing Effect of Semi-Indirect Lighting Units



Spaciousness Gained by Absence of Ceiling Lights



Bare-Lamp Fixtures Are Often Harsh in Effect



Indirect Light from Above Cages Floods the Room

related question of amount or "level" of illumination, expressed in foot-candles. "Level of illumination" is the term used by lighting engineers to indicate the amount of light; a high level of illumination refers to a relatively large amount of light, and a low level to poorer illumination. The meaning of the term, foot-candle, as the unit by which the level of illumination is measured, is generally understood. It may be readily defined; 1 foot-candle represents the level of illumination on a surface 1 foot away from a light source of 1 candle, and perpendicular to the light rays.

*Level of Illumination.* Too many fixtures are installed, even today, with little regard to their performance as lighting devices. The lighting results are sometimes deplorable. It is surprising how many times certain lighting engineers have been called in to correct faults in bank lighting after an installation is put in and is working. Sometimes these complaints are due to glare, but in most cases it is simply a matter of insufficient illumination in the working areas. The question of the level of illumination has of late engaged major attention by reason of data from research laboratories as well as under working conditions. The experiences show that, with the average amounts of artificial lighting prevailing today, our eyes cannot see as easily, as quickly, or as accurately as they are capable of doing. As a result, much muscular and nervous energy is expended through eye strain and eye fatigue under low illumination, and we are confronted with an astonishing prevalence of eye defects.

The amount of light recommended for banks is 10 foot-candles for lobbies and banking rooms, and 15 foot-candles for cages and offices. These units of illumination, while not ideal, are generally accepted as reasonably adequate for the visual requirements of banking, assuming that care is taken to diffuse and distribute the light properly. With an acceptable standard of illumination set down as a starting point, the problem is then one of choosing methods, equipment, and wattage by which to accomplish the result satisfactorily, and which, at the same time, remains answerable to a treatment which enhances the importance of the architecture and is in harmony with the spirit of the interior. It would be serious if a lighting installation did not first and foremost measure up to its responsibilities from a utilitarian standpoint; and second, it would be unfortunate if advantage were not taken of its further possibilities to create a pleasing effect.

*Lamp Sizes and Efficiency.* The discussion of this subject will be facilitated by the introduction of another term, the "lumen." The lumen is the unit in which the light output of a light source is measured. Modern lamps are all rated in lumens of light output. The larger the lamp, the more efficient it is, as measured in lumens per watt. Table I shows the lumen output and lumens per watt efficiencies for several representative lamp sizes. The lumen output for lamps of all sizes may be obtained from the lamp manufacturers.

TABLE I

Comparative Efficiencies of Large and Small Lamps

| *Lamp Watts* | *Lumen Output* | *Lumens Per Watt* |
|---|---|---|
| 25 | 235 | 9.4 |
| 100 | 1320 | 13.2 |
| 500 | 9500 | 19.0 |
| 1000 | 22000 | 22.0 |

As is evident from Table I, it is always more economical, other things being equal, to use a small number of large lamps than to use a large number of small lamps to obtain a given foot-candle level of illumination.

*How To Get 10 Foot-Candles.* If 1 lumen is evenly distributed over a surface of 1 square foot, the level of illumination on that surface is 1 foot-candle. Therefore, a level of illumination of 10 foot-candles means that there will be 10 lumens per square foot actually delivered on the working plane over the entire area in question. Knowing the number of lumens wanted on the work, the problem is that of determining the number of lumens absorbed in the equipment and the number utilized on the ceiling and walls, in order to determine the total number of lumens required. For accurate lighting computations, the various text books and the bulletins of the lamp manufacturers should be consulted. The design procedure takes account of such factors as ceiling height, room size, and color

Freedom from Glare in Office Space; Semi-Indirect Lighting

Shaded Wall Brackets and Desk Lamps in Executives' Office

of walls and ceiling, all of which influence the resulting illumination. Table II is presented as a means of obtaining a rough check on the lamp lumens required with three different types of equipment, assuming a room of average size, with a light colored ceiling.

TABLE II

A Rough Check on Where the Lamp Lumens Go

| Type of Equipment | Absorbed in Equipment | Allowance for Depreciation | Absorbed by Ceiling and Walls | Reaches Working Planes | Total Lumens Multiplier |
|---|---|---|---|---|---|
| White Glass Enclosing Globes | 20% | 20% | 30-35% | 25-30% | 3-4 |
| Indirect and Semi-indirect Units | 25% | 25% | 30-35% | 15-20% | 5-6 |
| Concealed Units—Cove Lighting | 30% | 25% | 30-35% | 10-15% | 7-10 |

*The "Total Lumens Multiplier,"* in the last column of Table II, may be used as a short-cut figure for determining roughly the total lamp lumens required to light a given banking area. For example, if a bank lobby 50 feet by 100 feet is to be lighted to a level of 10 foot-candles, multiplying the area, 5,000 square feet, by 10 gives 50,000 lumens to be delivered to the working plane. Say semi-indirect lighting is to be employed, for which the multiplier is 5 to 6. The lamp lumens generated must then be in the vicinity of 50,000 times this multiplier, or 250,000 to 300,000 lumens.

*Decoration and Lumens.* At first thought these figures may imply a decided inefficiency in the use of electricity to produce a desired illumination on the working plane. It should be remembered, however, that a considerable percentage of the lumens shown as absorbed by the ceiling and walls are reflected back and forth between these surfaces and, though wasted as far as lighting calculations are concerned, are highly useful from the standpoint of general effect. These are the lumens that brighten up the interior,—that reveal architectural beauties and lend general character to the interior. In this connection a dozen large banks were recently inspected and foot-candle readings taken in the main banking rooms. It was found that the working light measured from 2 to 6 foot-candles. Many of these rooms seemed dull and somber, out of step with the progress and spirit of the age,— in fact, out of keeping with their real ideals as reflected in modern bank advertising. One survey in complete detail of the electrical advertising used by one large banking house with over 50 branches indicates that the lighting employed for outside advertising purposes alone is comparable in amount to that used for interior lighting. Admittedly, it is important for banks to create favorable impressions by means of effective outdoor advertising. But is it not of equal or of greater importance for the interior lighting of the bank to be such that it too creates a favorable impression upon those who enter to transact business?

*Lighting the Lobby.* While the use of all bank lobbies and consequently their lighting requirements from the standpoint of vision are the same, the methods of lighting do not admit of any degree of standardization because of the wide diversity in architectural treatment. Examples range from the simplest store-like interior to those of highly ornate character with high vaulted roofs not unlike those of churches. The types of lighting may range from the orthodox suspended ceiling fixtures to such highly specialized methods as lighting from concealed sources,—coves, artificial skylights, and windows, — incorporated in the architectural plans.

*Cage Lighting.* It is a generally accepted fact that the work done by tellers and clerks requires more light than the lobby proper, and this has resulted in the almost universal practice of installing above the windows standard cage lighting units consisting of continuous troughs with small lamps behind diffusing glass cover plates. This is a very satisfactory form of supplementary lighting, and if the general illumination of the banking room is of the order of 10 foot-candles, this supplementary system will build the illumination up to that of the 15 foot-candles recommended. Foot-candle readings taken in a number of instances showed only 6 to 10 foot-

Overhead Lighting and Individual Lights

Semi-Indirect, Totally Enclosed Lighting Units

candles on the tellers' desks, but in these cases the general lighting ranged from 3 to 6 foot-candles. The deficiency, therefore, was in the general lighting of the room as a whole and not in the supplementary cage lighting. Because the prevailing levels of bank illumination are below the accepted standards, it is probably true that we find more local desk lighting units and more eye shields used by bank employes than by many other classes of office workers. In three cages in a large main bank a total of 13 individual desk lamps was observed. The inevitable result of such practice is splotches of high intensity light amid general gloom,—a lighting condition which ophthalmologists would have us avoid if we are to conserve our eyesight.

*Offices.* The level of illumination recommended for private and general offices in which close work is done, is 15 foot-candles, while for those offices in which little or no close work is done, 10 foot-candles suffice. In either case, where the ceiling permits its use, indirect or semi-indirect illumination evenly distributed over the working area should be employed. With such a system no individual desk lamps are necessary, and the attendant abuses and misuses are avoided. In many of the smaller banks and branches, where the general office work is done in sections adjoining the tellers' cages in the main banking areas, it is sometimes difficult to obtain the desired level of illumination from the overhead general lighting system. In these cases special lighting should be provided, such as sidewall brackets, supplementary overhead illumination, or well designed table lamps. A well designed table lamp might be defined as one which, by its construction and location, illuminates the table top adequately without glare,—either direct or reflected from the table top,—into the eyes of anyone working in that vicinity. Indirect lighting presupposes there being a ceiling and interior finish in light colors. Where such conditions do not prevail, there has been the inclination to compromise, because of otherwise poor efficiency, on direct lighting with white enclosing glassware; but whether this is the proper compromise is a debatable point in view of the trend toward higher levels of illumination. Better, perhaps, would it be to insist that interiors be finished with reference to the illumination system rather than the reverse, if we were to consider efficiency only.

Luminous Information Signs Are Used to Advantage

Luminous-Bowl Indirect Units Give Diffused Light

# NOISE PROBLEMS IN BANKS

BY
CLIFFORD MELVILLE SWAN
CONSULTANT IN ARCHITECTURAL ACOUSTICS

THE necessity of producing quiet surroundings in banks and business offices, not to mention other types of buildings such as hospitals and schools, is daily claiming more and more attention. This is due to facts developed in various lines of research and experience, all pointing to the one conclusion. Medical science, for instance, informs us that there is a chemical and physiological action produced in the nervous system by prolonged exposure to noise, and that the resultant fatigue may go so far as even to cause collapse. Statistics in the medical department of one of our large banks showed an immediate and marked drop in the number of cases treated daily among the women clerks after the noise in the working rooms had been diminished. Experiments in psychology, as well as operating tests by office managers, show that the change from noisy to quiet surroundings results in greater freedom from errors and that more work is accomplished.

An interesting experiment was lately made by Dr. Donald A. Laird, of Colgate University, described in an article on "The Measurement of the Effects of Noise on Working Efficiency," published in the *Journal of Industrial Hygiene* for October, 1927. Dr. Laird found that 19 per cent less energy was consumed by a typist when working under quiet rather than under noisy conditions. The rapidity of work was also affected, there being an increase of 7.4 per cent in speed in the case of his most rapid typist when in quiet surroundings. Furthermore, under these conditions, there was an increasing output of work with the lapse of time, as the typist "warmed up," while the reverse was the case under exposure to noise. These results are verified by tests in the bank before mentioned, where the introduction of sound-absorbing treatment in a large adding machine room housing several hundred employes caused an average shortening by several minutes of the time necessary to do a stated amount of work every day. The statement is sometimes made by office managers that noise is soon relegated to the subconscious mind, that workers have become accustomed to it and do not think about it, and that the expense of installing absorbent materials is needless and wasteful. Nothing could be more untrue. Many workers of sensitive temperament are unable to shut the noise out of their consciousness, while even those more fortunate individuals who have the ability to concentrate do not for that reason escape the fatigue and loss of energy which inevitably occurs, even if subconsciously, as researches have established.

Modern science, having in some of its branches

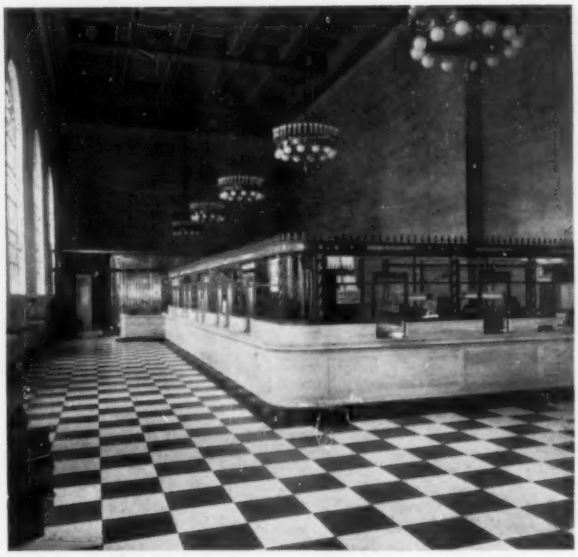
Noise Problems Are Often Negligible Where Surfaces Are Small and Varied

The Open Office Spaces and Many Machines of Modern Banks Complicate Noise Problems

established the fact that noise is undesirable, unhealthful and uneconomical, proceeds through other of its branches to develop and use materials and methods of building construction which produce the maximum of noise. This is due primarily to the demand for fireproof structures and for sanitary surfaces susceptible of frequent and easy cleaning. Consequently, we have the ever-increasing use of concrete, hard plaster, glazed tile and brick, terrazzo, stone, marble and the like. Even the office furniture and partitions are frequently of steel. What happens in a room finished in these ideal sound-reflecting materials? The pound of an adding machine lever, the click of a typewriter key, the ring of a telephone bell, the scraping of a chair,—any sound,—once produced in such a room, will send out a train of sound waves into the adjoining air. These waves travel until they meet the hard surfaces in every direction and are there reflected back on themselves with little loss of energy. The waves from one little sound will continue this process of reflection many hundred times, crossing and re-crossing, before their energy is finally dissipated. This takes several seconds of time, during which new sounds are being created to add their energy to the first and to one another. This causes an accumulation and consequent magnifying of sound in the room such as would not exist if each train of sound waves were fully absorbed in the course of only a few reflections. Add to this the increasing number of labor-saving but noise-producing office devices, and we find that the tendency is to make our offices more noisy instead of less so.

Of course, this is a condition which should not be tolerated. In every other direction, consideration is given to the comfort and health of the worker as affecting his efficiency. Lighting systems are carefully planned to give uniformly diffused illumination with the requisite number of foot-candle units at the desk. Colors of walls and positions of windows are carefully considered. The exact degrees of temperature and humidity most conducive to efficient output are studied and often secured. The flow of fresh air, its velocity and direction, and the percentage of carbon dioxide accumulated are all worked out with care. Even the best method of chilling drinking water has been made the subject of study; on a par with these in importance is the reduction of noise. The old adage concerning the value of an ounce of prevention is, of course, the first thing to remember. Floors should be covered with noiseless materials such as linoleum, cork or rubber tile, mastic preparations or the like. Machines should be of the "noiseless" variety as far as possible, or else segregated in one room which can be quieted. Harsh telephone bells should give way to mellow buzzers. When all such precautions have been taken, however, there must still remain a large amount of unavoidable noise, and it is of the utmost importance that this shall not be magnified by the reflecting process within a room. Sound-absorbing materials must be introduced in sufficient quantity to reduce the reverberation to a minimum.

The materials used for such purposes may be roughly divided into four classes,—furnishings, fiber boards, felts and masonry materials. The use of carpets, heavy hangings and stuffed furniture is not practicable for the average business office, except in such rooms as those for directors and executives, or for conferences. In such rooms rugs or carpets lined with half-inch felt, heavy curtains interlined, and overstuffed chairs and divans produce all the absorption required. In public and work spaces, however, and even in the average private office, such furnishings are undesirable and out of place. Hence, in the vast majority of cases, one must turn to use of materials of the other three classes which can be permanently placed on ceilings or walls, or both, and



The Treatment of Walls and Ceilings Affects the Acoustic Qualities of Banking Rooms

which will be pleasing in appearance and effective.

Let us first consider the fiber boards. These may sometimes be open to criticisms on the score of appearance, lack of durability, poor light reflection, or even low resistance to fire, but such is not always the case, and there are many places where their use is particularly desirable. They are usually low in cost, and some have the highest absorbing value of any material. They are semi-rigid and consequently easily handled. There are many types on the market, of varying degrees of efficiency. In general, the more compressed the board the less porous it is, and consequently the less efficient as a sound absorber. On the other hand, if it is but lightly compressed in manufacture, so as to form a spongy material, it may absorb a great deal of sound. This is particularly true of those boards which are perforated or scored in order to offer a greater surface to the sound waves. Fiber boards are made of sugar cane refuse, flax, wood fiber, excelsior and the like, varying widely in absorptive value with the thickness, degree of compression, amount of perforation, and the pitch of the sound.

In the class of felts, there are also a number of kinds, all nearly equal in efficiency, thickness for thickness. They are made of cattle hair, goat hair, jute, wool, shredded wood fiber and other substances. In some cases the fibers are simply felted or matted together, while in others, known as "punched" felts, the fibers are pushed through an interlining of burlap or some similar fabric which holds them in place and produces a firmer and more durable material with less likelihood of shearing of the face from the back than in the ordinary felting process.

Masonry materials are sometimes of tile and sometimes of plaster. There are several types of each. Being rigid substances with little or no flexibility, they rely almost entirely on their porosity to absorb sound. For this reason, different kinds vary considerably from one another according to their manufacture and application as affecting the number, extent and size of the intercommunicating pores which dissipate the sound energy. Of the tile, some are fired and some are cast. They are particularly desirable for vaulted ceilings or for wall ashlar where a true structural effect is sought. They form a permanent finish which does not deteriorate, which is fireproof, and which has a high acoustic value. They must be placed in the front rank of corrective materials. The plasters also are of several kinds. Some have their pores formed mechanically by uniformly graded aggregates, some chemically by effervescence, while in one type the holes are punched in the wet plaster by fine wires. The plasters, like the tiles, are fireproof, and are as durable as any standard plaster.

In choosing a material for sound correction, careful consideration must be given to the variation in absorption over the scale of pitch. There is a wide difference of results in this respect, and no material can be used intelligently unless reliable data are available showing the percentage of absorption over at least the most important region of the scale of audible tones. A material which will correct an auditorium for the hearing of speech may be entirely unsuitable for the hearing of music. Again, a finish which may be proper for music or speech, or both, may have almost no effect in absorbing office noises. The prevailing characteristic of office sounds seems to be the prevalence of very high pitches lying three, four or more octaves above "middle C," that is, from 2000 cycles up. In order to be effective as an office quieting agent, therefore, a corrective material must have high absorption at these upper pitches, regardless of what it may have in the lower scale. Some of the materials we have considered have this property and some have not. Some, which in themselves

are satisfactory, lose their efficiency when a decorative finish is applied.

This brings us to what is undoubtedly the most serious problem in the practical field of securing quiet in offices. In order to reflect light in sufficient quantity, and to present a surface pleasing in appearance, many absorbents must either be painted directly or concealed by a painted cloth covering. Especially in the latter case does this more or less impervious layer of paint constitute a barrier to the passage of the sound waves into the absorbent structure beneath, and this effect is most marked at the high pitches already mentioned as most difficult. The result is fatal to an effective result. On the other hand, if the surface is not painted and the pores are left open to the impinging sound, these same pores accumulate dirt and the surface becomes soiled so that both appearance and light reflection are impaired. The ideal solution would be to use over the absorbing material a coating which would be impervious to dirt, permitting passage of the shorter sound waves, and yet reflecting the light. Furthermore, the surface should be capable of being washed or redecorated or otherwise renovated without deterioration. Such a coating has yet to be discovered.

We have here one of the great objections to the use of felt and some fiber boards. Those which are natural'y dark in color require such a heavy coating to build up the light reflection that the sound-absorptive effect is too greatly diminished. Various schemes have been tried to overcome this difficulty, but none is wholly satisfactory as regards either appearance or permanence. Light colored materials on the other hand, like the tiles and plasters and some of the fiber boards, can be sprayed or stippled with a thin paint, such as water color, without serious damage to the absorption. The cast tiles, which have a fairly smooth surface, can even be washed and scrubbed when necessary. Apart from the effect of the decorative coating on the absorption of sound, we must consider the actual absorbing curve of the material itself. Obviously, those substances which have low absorption in the higher register must be ruled out. Use should be made of only those materials which show a high percentage of absorption above 2000 cycles, as otherwise the area of treatment required becomes so great as to be too expensive and often entirely impracticable.

Among those materials which show a sufficiently high degree of absorption in the upper pitches, it is interesting to note another feature. Laboratory measurements of absorption have thus far been limited to an upper boundary four octaves above "middle C" (4096 cycles). The limit of human audition is far above this. Whether any considerable portion of office noises consists of sounds above this pitch, and if so, whether they have any marked effect on the ear or nervous system, has never been demonstrated. If, however, these higher pitches should prove to be of importance, it is evident that those materials showing an ever-increasing percentage of absorption as they approach the pitch of 4096 cycles may fairly be assumed not to fall off sharply for some reasonable distance beyond this point and therefore to be more effective in this region than materials showing a descending curve at 4096 cycles. Of all the absorbent materials in use, the acoustical plasters alone show an ascending instead of a descending curve at the point mentioned. While, of course, too great a stress must not be laid on this fact, it is interesting to observe it, and future experiments may determine how far it is an argument in favor of the use of such materials.

It is a matter of congratulation that the need for quieting treatment is daily becoming more and more recognized and that new materials and methods are constantly being developed to meet this need. There are now about 30 such on the market. Caution must be exercised, however, regarding materials for which unjustified claims of acoustical efficiency are made. Because a surface is rough in texture or pitted with holes, it does not necessarily possess absorptive qualities. Nor does the presence of a number of sealed and isolated air cells in the interior give any absorption for reflected sound, although this does decrease the transmitted sound. Again, resilient material like cork and rubber, while preventing the production of sound, do not absorb incident sound waves to any marked extent. For high absorption, the cells or pores must be intercommunicating, fairly uniform in size, and of critical diameter; in other words, the material must have a texture throughout its mass much like sponge or coral with diminutive pores.

In our banking institutions a large field is presented for the use of these materials and quieting methods. The lofty and monumental spaces used by the public should be freed of their cave-like resonance; cages of tellers and clerks should be quiet to insure speed and avoidance of mistakes; adding and statistical machines, typewriters, telephones, switchboards and telegraph instruments should be segregated in treated spaces for the welfare and efficiency of the operators and the comfort of the others; conference rooms and executive offices should be quieted to insure privacy. The question is sometimes raised as to the desirability of subdividing working spaces into numerous small offices by partitions running to the ceilings. In general, this is not to be recommended from the acoustical standpoint. It is usually better and more effective to apply general treatment to a large open space than to treat small individual offices where the ratio of the ceiling area to the other surfaces is much smaller than in the large rooms. Low partitions, such as those enclosing cages are, of course, permissible.

Even in the brief survey of the matter made here, there should be facts sufficient to demonstrate not only the necessity of quieting but also the desirability of an intelligent study of the methods and materials to be used in any case. A little forethought will save much annoyance, criticism and expense.

# BANK VAULT CONSTRUCTION AND EQUIPMENT

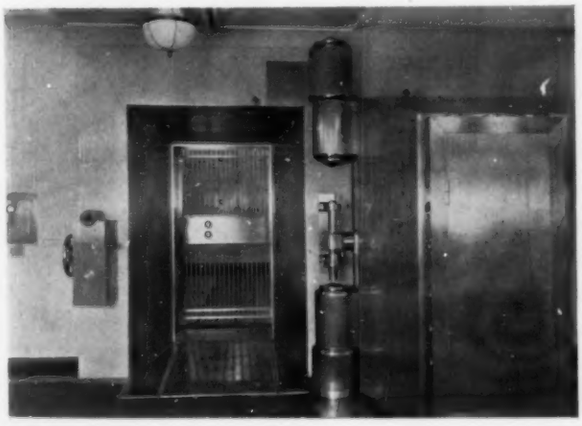
BY
FREDERICK S. HOLMES
VAULT ENGINEER

THE history of bank vault design has had little influence upon today's planning. While it is intensely interesting in the many changes in both principle and detail evolved to withstand the ever-developing technique of burglar attack, and while it becomes absorbingly fascinating when those changes are related to their causes, such retrospection is almost useless in planning a vault capable of resistance commensurate with the actual and potential powers of the skilled burglar of today.

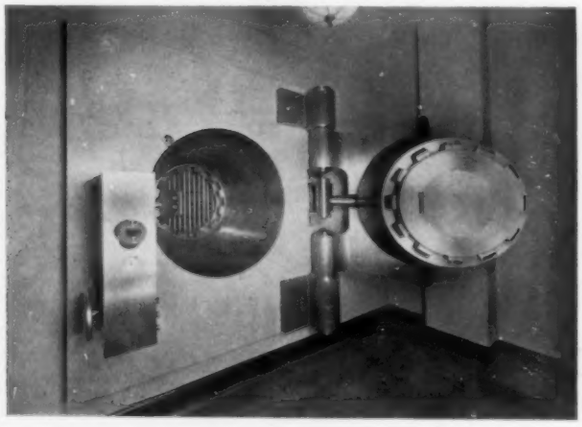
For half a century the fundamentals of protective strength in vaults remained practically static. There were some modifications to offset the introduction of the use of nitro-glycerin as a part of the attacking equipment, and refining of mechanical detail and securing better machine finish were developed, but on the whole, all demands were being met satisfactorily. Then suddenly the cutter burner, the fluxing rod, the electric chisel and hammer, and even the oxygen pipe, were prostituted to burglarious purposes, creating almost overnight a really terrifying menace that necessitated equally revolutionary changes in design and construction. Resistance-time values fell tremendously, and they are still low when related to construction costs as compared to those formerly obtaining. It took the vault designers and builders several years to adjust the industry to the new forms of menace. And though it is not possible, even utilizing the best available materials, to design a vault within reasonable cost limitations that would resist successfully a fully organized attack by the best known experts for more than a comparatively few hours, the situation is not as dangerous as might be inferred.

Any menace from the experts is quite remote, for they are few in number, well known, and employed in legitimate industry. Were they to become burglars, being men of intelligence they would not attack high class construction, involving some hours of the hardest kind of work and a large investment in equipment, when with their skill and the most rudimentary of outfits they could successfully burglarize most of the existing vaults in the country in a surprisingly short time. Moreover, it is relatively easy now, at reasonable cost, to provide protection that is adequate to resist attack by all burglars other than the known experts.

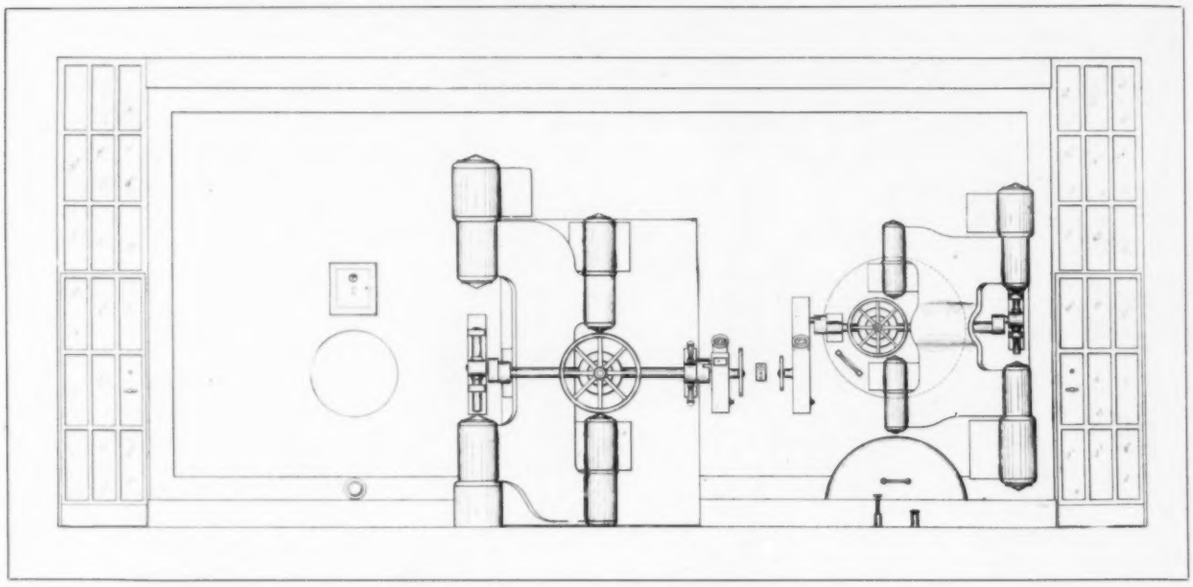
*The Vault.* What constitutes a vault that today provides adequate protection? Engineers, whether acting as consultants or employed in the industry, disagree upon details, but they are in agreement upon fundamentals. There is no doubt that protection against fire is best served by the use of reinforced concrete walls; that tool, torch, and shock resistance is afforded with composite metal linings or inter-linings; that a single and thick door with few or no rebates affords the most protection for a given cost, with emergency doors provided in an otherwise single-door vault; that the entire structure should be so located as to afford free observation upon all its six sides; that electrical protection is essential; and that liberal ventilation must be assured. But opinions regarding the details to be employed in providing these fundamentals differ more widely than is warranted by an analysis of the known facts. Perhaps the greatest diversity of opinion is exhibited with respect to the value of reinforced concrete walls without linings or interlinings where dependence is placed upon such construction for burglar resistance as well as fireproofing. This is a most important question, because the correct answer is essential to providing adequate protection under present-day conditions. The disagreement arises from three causes—(1) sales competition, influenced by the effort to obtain contracts through low prices; (2) the lack of adequate requirements for low burglary insurance rating through the manual which is based on what might be termed "vault mortality tables"



A 36-Inch Emergency Door



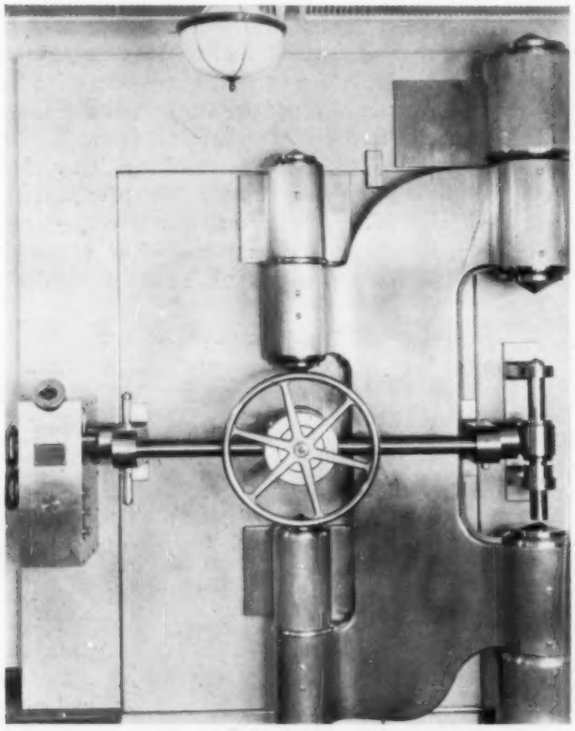
A 36-Inch Security Door



'Front Elevation of Vault, Showing Ventilating Hood Depressed

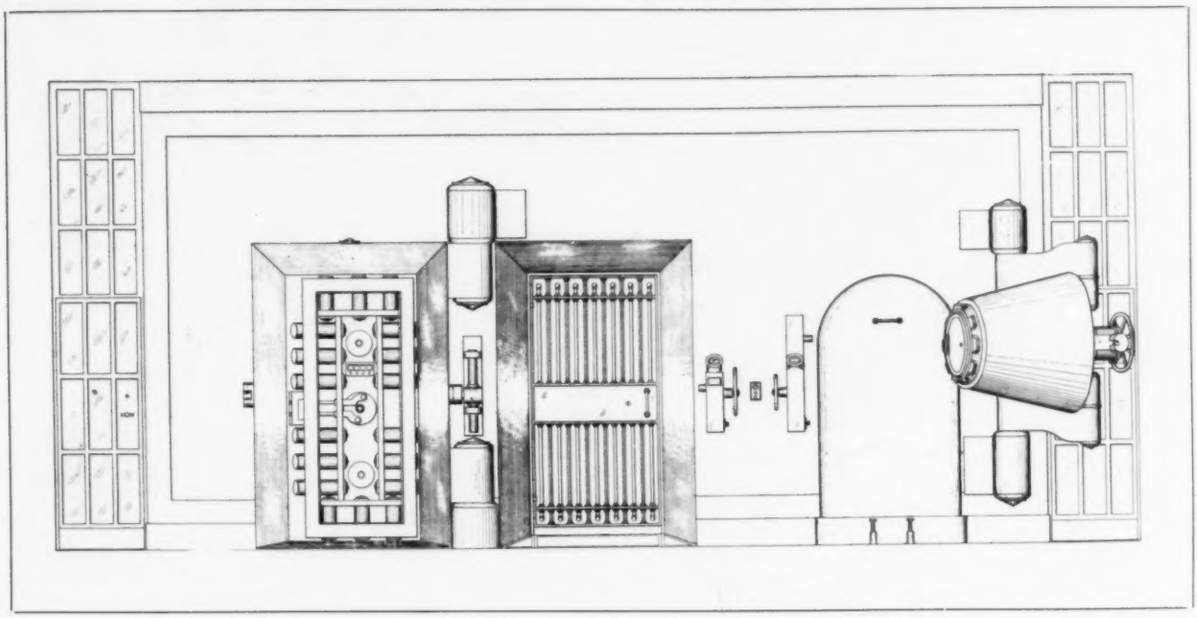
rather than upon the actually known resistance value of the constructions rated, as determined by unprejudiced tests; (3) and perhaps most of all through the broadcasting of peculiar interpretations of evidence produced by various tests.

Ordinary reinforced concrete of itself can be cut by burglars' tools with what, to those accustomed to seeing its demolition in the usual manner, would seem amazing rapidity, the concrete being removed and reinforcements cut with either hammer and chisel or the torch. It has been demonstrated that a manhole 2 feet in diameter can be cut through such a wall in less than two hours. The time consumed in cutting the hole is naturally dependent on the type and materials of the reinforcements and the number and skill of operators, as well as on the efficiency of the tools and torches they employ. Shock, tool and cutter torch resistance (and that involves not only resistance to the naked flame of the oxyacetyline torch but the fluxing rod and oxygen pipe combinations), is obtainable with linings and inter-linings which are available to all manufacturers through the use of several metals and materials. The shock resistance in this type of vault construction is provided partly by the inherent strength of the tool- and burner-resisting elements, and even more by plates of low steel, which tie and support them. A tool-resistant element commonly used is five-ply welded steel. The deep chilled outer face and diamond-like crystals of a special product, recently developed for the purpose, combine in a single plate both tool and cutter torch resistance. Metals of various kinds, both plain and in combination with copper and other metals, are being used, and though steels of all kinds are easily cut with the torch, simple cast iron has a degree of resistance such that, though simple perforation is not difficult, to cut a manhole is a tedious operation and can be done only by experts. Such materials constitute the lining, or it may be the inter-lining, the latter term being applied when there is an interior buttressing element or construction having on its inner face the usual open hearth steel plates.



Security Door, Closed

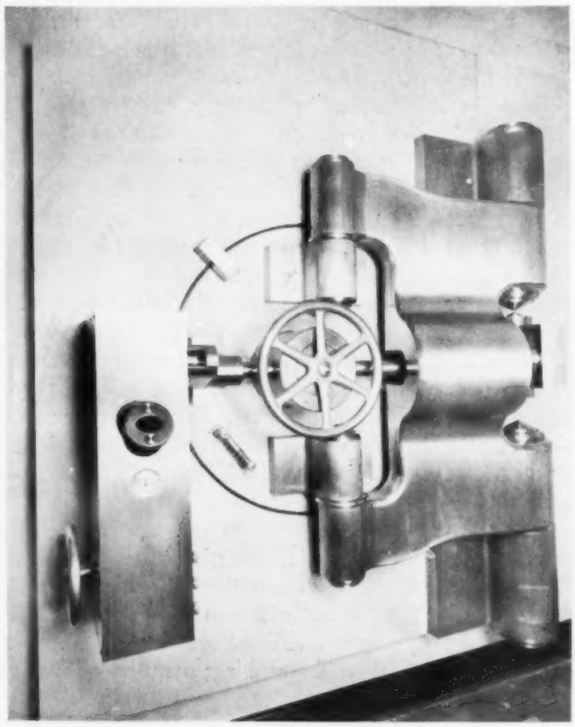
The burglarious method of entering a vault with reinforced wall and steel lining is to take away a section of the concrete envelope, cut an opening manhole size through the lining, push the released disc into the vault, and climb in. With a drill-and-



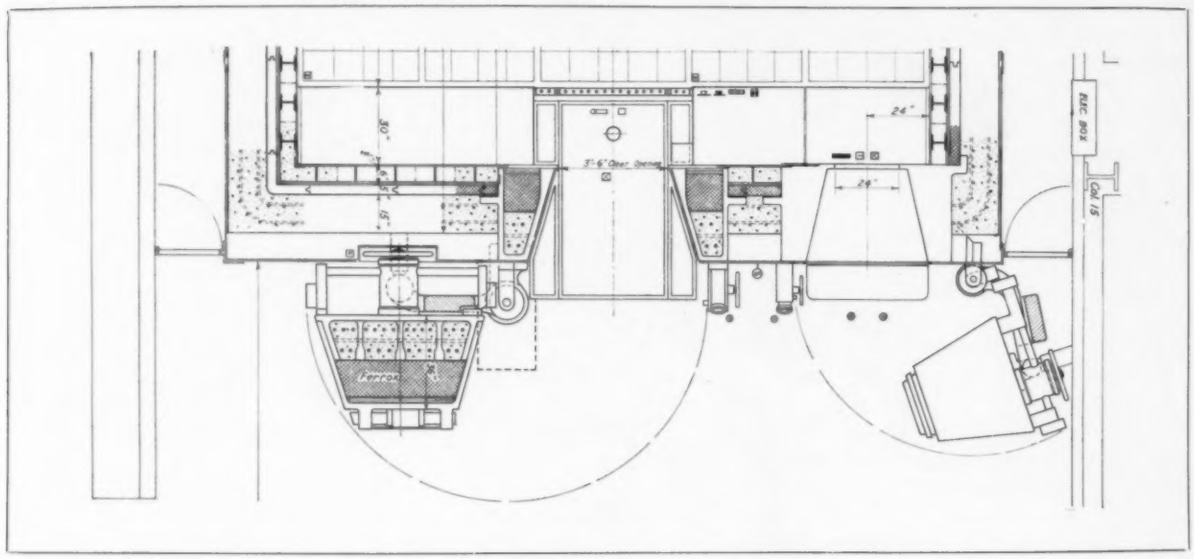
Vault Doors Open; Ventilating Hood Raised in Position

torch-resistant lining such an attack is made more difficult. But since there is constant development and counter development, and in view of the reasonable advances in attack technique that unquestionably will be made during the future lifetime of a vault, it is desirable to be somewhat ahead of the known present demands for adequate resistance. Therefore, in some vault walls there is the outer envelope of reinforced concrete, then the tool-and-torch-resistant inter-lining backed by a buttressing wall. With a buttressing element backing up such an inter-lining, even though some rapid means of cutting the latter should be devised, a cut-out disc could not be pushed in, and since the inter-lining is anchored at frequent intervals to the inside wall, the piece could not be pulled out but must be removed in small sections, requiring a long period of time. The buttressing wall, although of cheap construction, more than doubles the value of the inter-lining. One of the most economical and efficient designs is a series of H-beams closely bolted to the inside of the inter-lining, with intermediate rows of steel studs tapped into the inter-lining and steel inner-lining, which is also bolted to the inside flanges of the beams, the space between being solidly filled with concrete. It is best to consider the advisability of creating the greatest resistance time, so that the structure will be wholly beyond the "yegg" class.

*Vault Doors and Locks.* Door design follows rather closely that of the wall, with this difference,—that the door is a section of the wall with a joint, and must be treated with reference to the weakness of that joint. And there is another still more important difference, in that while the wall must be entered through a manhole, the door need have but a single small hole opposite the vital spot at the locking connections. Therefore, in the door, as compared to the wall, resistance to shock, tool, and burner must be greatly increased without the necessity of increasing the fire resistance. If the doors are thin, the chances of successful burglary can be improved by increasing the simple perforation to handhole size, through which the connections may be easily reached and disrupted. If the door is measurably increased in thickness, so that the operator stands 2 feet, or even 3 feet or more away from the locking mechanism, the difficulties of entry are so increased that thick doors, aside from their ad-



Emergency Door, Closed




Section Plan; Security Vault of Buttressed Wall Design

vertising value, are warranted. They provide not only maximum resistance but cost comparatively little more than the thinner construction, because once given a set of hinges, pressure mechanism, bolt work, and locking devices, they can be made proportionately heavier and the door materially thickened at a comparatively small cost. The combination locks, locking devices, and the bolt-throwing mechanism may be transferred to the jamb, leaving the time lock on the door. In an attack this makes two penetrations necessary. Since there are always chances of failure with a single penetration where the locks are combined, these chances of failure are increased many times when the locking mechanisms are separated; and the attack-resistance time is more than doubled at slight additional cost. Ordinarily, the locking mechanism can be seen on the inner face of the door. With a balanced construction, where it takes as long to put a small hole through the door as to put a manhole through the wall, successful operation upon the locking mechanism through a small hole in the wall so unbalances the design as to reduce resistance-time values perhaps 90 per cent. A cure for this is to house the combination locking mechanism with heavy steel plates, so that it cannot be reached in such a manner.

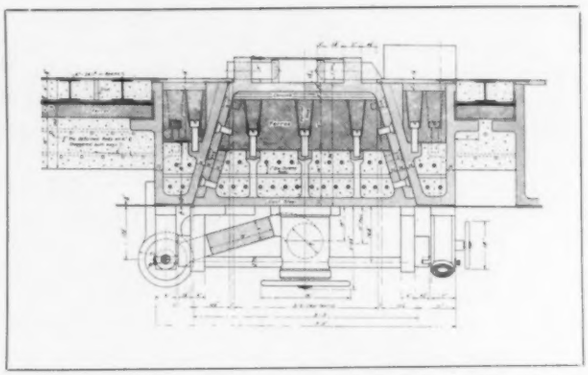
Single doors, rather than outside and inside doors, have almost entirely superseded those of older design. The cost of second door hinges, pressure, bolting and locking mechanisms and the cost of the vestibule and the extra width and height of double-door construction made necessary to get a given clear opening, if put into a single door give many times the resistance value. The elimination of tongues and grooves and rebates at the edges of the doors and the substitution of a single machined surface constitute a marked advance in value and appearance of vault doors. These are referred to generally as "plug doors." The change has come about through a realization that every rebate is a reaction seat against which explosives may work to tear the door apart. This does not apply with as much force to modern heavy doors as to the thinner doors of laminated design. Furthermore, it is somewhat more expensive to make a door with steps, and the result is not nearly so impressive as the plain surface. Again, the plain step lends itself to a very low incline at the bottom of the door, some 3 or 4 inches in 3 or 4 feet, and this incline is so flat that the lowering platform of yesterday is not required except in the case of round doors, which are no longer the vogue.

Little change has come about recently in the design of time and combination locks. The time lock assumed its present state of mechanical simplicity several years ago, after having undergone a series of complicated changes. It now means only the winding of a time movement set for a given number of hours, at the expiration of which a dogging mechanism is automatically tripped and the boltwork released for unlocking. If these time movements were absolutely dependable, only one would be necessary. But they are not, and because time lock experts may not be available when a movement fails, the smallest number in use is two. To avoid the danger of a lockout because of the possible failure of the remaining movement, a third movement is common. Four movements are frequently employed to be well on the safe side of things. The combination lock has not changed in principle for 40 years, as it would seem that it had then been brought to practical perfection. Automatic bolt-throwing devices, in the form of springs or weights, have been abandoned, as once set they cannot be controlled to unlock the boltwork at the time determined. The now standard time lock goes off duty at the beginning of business hours, but the combinations still maintain the door in a locked position so long as may be desirable. A refinement of

recent years consists in the counter-balancing of the so-called foot bridge or foot plate which forms the runway through the entrance. As doors grew wider and thicker, these plates became difficult to operate until accurate counter-balancing at all points of their swing became a necessity. The emergency door is small, usually circular. It should be a counterpart of the main door in construction, and is always to be recommended. It not only permits immediate access to the vault in the event of a lockout of the main door, but affords means of ventilation, a subject that was almost wholly ignored in former years.

Ventilation has become recognized as one of the important features of vault design. It may be accomplished in several ways. The emergency door may open into a plenum chamber from which the air under pressure is forced through the opening, deflected to distributing conduits either at the ceiling or under the floor, liberated at the ends of the aisles to find its way through the vault and out the main door, where in the better class of installations it is picked up by a ceiling exhaust register; or, where the use of a plenum chamber is not practicable or desirable, a fan draws the air in through the emergency opening and effects the same interior distribution. Or else interior ductwork may be connected directly to an outside supply by a hinged conduit section which during the day is located against the top of the vault door opening. A combination of supply and exhaust ductwork has been used in some of the largest vaults. This type confines itself to the circulation of the air entirely within the vault. The need for ventilation rests largely upon the fact that a great number of heat units are liberated in the vault by the lighting system and must be taken out by forced draft, since a vault has no fenestration, and the air space is relatively small for the number of people using the vault.

*Vault Equipment.* The usual vault equipment needs no particular description here, but it is interesting to note that the use of stainless steel has in the last two or three years obtained wide favor, and that tens of thousands of safe deposit boxes, as well as many paneled steel ceilings, vault door finishing plates, and architraves, are being made of this material, which seems to be stainless in fact as well as in name. It is a trifle harder to work than low steel, and while the per pound cost is high, the elimination of upkeep costs may make it a good investment. Furthermore, its use does away with the otherwise necessary coating of anti-rust materials, usually in the form of oils and greases, which must be kept fresh to avoid rust and which frequently damage the clothing of box-renters. In recent years plate glass mirrors, located at the ends of transepts or aisles, have become popular by not only adding to the attractiveness of the interior finish but to a degree actually functioning as a protective element, in that all sides of a person standing in the aisle and facing the boxes can be observed by the custodian or who ever is in charge of the vault.



Horizontal Section of Door; Composite Construction

It is unfortunately true that often too little consideration is given to details of the design of safe deposit boxes. The subject fairly bristles with interest, not only as regards construction of the work, but also as to the business organization, policy and administration of the bank. The flat, uninteresting facade of a bank of safe deposit boxes gives little hint, to the uninitiated, of its real meaning. It is the curtain that hides a large proportion of the country's wealth, and conceals the things that spell comedy, drama and tragedy beyond belief. Frequently the whole of a man's possessions lies in his little tin slide behind a thin steel door, and it is often surprising to see what little thought is given to the make-up of this door.

The real crux of the material side of the safe deposit business, and its greatest danger, is in the key lock. One of the most famous lock makers of the world has said: "No lock having a key hole has ever been made or invented which is absolutely proof against picking, nor is it probable that one will ever be or can be made." Security is a relative term, and while no key lock is absolutely "pick-proof," some of them are so difficult to pick as to defy attack except by an expert aided by all favorable circumstances. This exactly describes present conditions, and while most modern safe deposit key locks are reasonably good, some are decidedly superior. As the security of the box depends upon the key, it would seem the part of wisdom to choose the best of locks. Practically all of the safe deposit locks being made today are of flat tumbler or lever type, some makers having as many as eight of these tumblers adjusted to a single key. Use of the preparatory or attendant's key is universal. Where the plain tumbler lock is used, the utmost protection should be given to the storage and handling of the keys before they are given to a box renter, because the honesty of the employes is the only guarantee against duplication of keys, and many robberies have been due to this cause. The so-called changeable key lock is undoubtedly the highest class safe deposit lock on the market today. This is a lock having adjustable levers which can be set to any selective key of its class. When a box is vacated by one tenant, these tumblers are returned to normal

position ready to be set to any other key. Meanwhile these keys are sealed in heavy paper envelopes, and a new renter selects his pair of keys by taking any package from the large number. In other words, the key he selects has never been seen by an employe of the bank.

As key locks are more or less readily forced from the door, and as "yeggs" have taken advantage of this fact, some devices have been placed on the market looking to reinforcing the lock and providing auxiliary bolts which spring into locked position when the lock is being forced. These devices, however, have not had a very wide application, except in outlying districts. Large boxes are frequently fitted with bolt work, and often have two locks, dial or key, providing double protection in addition to the custodian's check, and the dial or combination locks are fitted with supplementary key locks, the key being held by the custodian, to make sure that the box shall not be opened by the owner except in the presence of an attendant.

The importance of so small an item as the tin box should not be overlooked. Many of these are so weak in construction and so poorly finished that they should not be used. The tin, aside from the key, is the one part of the work that is handled by the box renter and should be rigid and nicely finished. The lid should be fastened with a high class latch or its equivalent Small key locks, once in universal favor, are now seldom used. The high class tin box of today has so-called "runners" pressed outwardly from the bottom, the box taking bearing on two narrow lines instead of across the entire bottom, which resulted in collecting dirt and dust.

The electrical equipment of the modern vault includes high tension wiring for the general lighting system, which, if the vault is large, is thrown on and off by an automatic switch actuated by a remote control operated through a key lock, instead of by the usual button, to guard against the possibility of the vault's being thrown into darkness either accidentally or intentionally. Some large vaults carry an emergency low tension lighting system which functions immediately if the high tension power is cut off. In large security vaults power lines are run in to operate various machines. Constant, night-burning lights are installed in most of the recently constructed vaults. These are used to permit anyone locked in the vault, accidentally or otherwise, to read an instruction card, giving the home telephone numbers of bank officials and indicating a method by which he may unlock the time lock and wait for the officers to release him. People have been locked in even the smallest of vaults, both accidentally and intentionally, and a unit of this sort is always desirable.

While under normal conditions the average person lives comfortably upon 100 cubic feet of air per hour, the mental strain upon a locked-in victim has been considered so serious that auxiliary devices to lessen this hazard of mental strain are upon the market. These have taken two forms,—one is the so-called breathing tube, which consists of a permanently installed tube, 3 or 4 inches in diameter, passing through the vault wall and fitted with a plug which can be removed from the inside of the vault. Some of these tubes carry small ventilating fans. Their practicability in extreme conditions has been questioned, and they should not be recommended in connection with the highest class of vault work. Tanks of oxygen with releasing valves and a chemical to be spread on the floor to absorb carbon dioxide have found some favor. Many vaults are equipped with closing alarm gongs, which ring at intervals during the time the vault doors are being closed and which are intended to act as a warning to any who may have remained unnoticed in the vault. As there is quite a list of accidental lock-ins, it would seem that consideration should be given to means of preventing them.

Electrical protection is somewhat outside the field of vault design, yet every security and safe deposit vault should be electrically protected. Often there is a question regarding the character of electrical protection to be used, whether central office or isolated alarm. This must be decided by conditions surrounding each installation. Sometimes it is answered by the adoption of both systems for a single vault, which of course provides double security.

Wherever practicable, a vault should be so located as to make possible arrangements for observation upon all six sides. Sometimes observation of the bottom can be effected only by setting the vault upon a series of low piers, spaced several feet apart, these spaces being observed through inclined mirrors located below glazed floor sections. This is the best safeguard against successful tunneling. Without these spaces even electrical protection is not always sufficient, because the circuits may be broken and such interruption interpreted as the result of grounding, corrosion, or the settling of foundations. Then all that could be done would be to cut out the damaged circuits and retain the remainder of the system, thus allowing a possible unprotected area for a tunnel. With observation there is always the resistance-time of the vault to be depended upon to carry between the rounds of the patrol, and more important still is the assurance, obtainable through it alone, that an interruption is not caused by a tunneling operation.

The entire subject of vault construction is so complicated and dependent on details, whether a large or small project be involved, that no attempt has been made here to cover it fully. A specification for a large vault and its equipment often covers several hundred pages. This may sound extravagant, but it is literally true. Moreover, such detailed description is essential to put vault bidding and building on the same basis of actual competition on a single definite design as is the case in general building construction. Without such detailed specifications, competitive bidding loses much of its value.

# SECURITY VAULTS OF REINFORCED CONCRETE

BY
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OFFICE OF SHREVE & LAMB, ARCHITECTS

PRIOR to 1920 the materials of security vault walls, unless they were of extreme thickness, were considered as being of secondary importance. In the smaller vaults brickwork was frequently employed, and occasionally concrete with a small precentage of steel reinforcing bars. The larger and more important vaults were in the majority of cases constructed of concrete heavily reinforced, but in all of them a steel lining was considered as offering the chief resistance to attack. This attitude toward steel linings was due to the position taken by the National Bureau of Casualty and Surety Underwriters, who in their Manual of Burglary, Theft and Robbery Insurance thus define a "Class 10 Vault," which is the highest classification they have established: "No. 10 Vault,—lined throughout with steel at least 1½ inches thick, or with walls constructed of *non-reinforced* concrete or stone at least 54 inches thick, or of reinforced concrete or stone at least 27 inches thick."

Vault engineers and vault manufacturers accordingly concentrated their efforts on the development of linings. Until the advent of the burning torch, drills and explosives furnished the only means of attack. Consequently, vault linings were designed to resist drilling, since if a lining could not be drilled, explosives could not be effectively used. The development of the burning torch forced vault engineers and manufacturers to experiment with torch-resisting materials, since it was found that materials which were drill-proof offered little resistance to the torch. Unfortunately, torch-resisting materials can be drilled with comparative ease and are readily shattered by explosives. Linings were therefore developed, combining, in several layers, drill-resisting materials with others designed to resist burning. This practice called for thicker linings, resulting in increased cost in both materials and fabrication. This, briefly, was the condition in vault design when the Federal Reserve Bank entered upon its extensive program of branch bank construction. Very little information of practical value was available, for although vault manufacturers had tested various lining combinations in their shops and laboratories, few, if any, extensive tests had been attempted under conditions such as would be encountered during burglarious or mob attack.

In 1920 the Federal Reserve Bank instituted a series of practical tests under the direction of Alexander B. Trowbridge, their consulting architect, in an effort to establish the relative resistance of all the known types of vault wall and lining construction and to rate these resistances in terms of cost. Tests can be made to show almost any result desired. The value of any test or series of tests, therefore, depends on the objective and the integrity and open-mindedness with which the tests are carried out. The Federal Reserve tests did not seek to discredit any material or method but merely intended to establish relative values. The test walls were constructed by a reputable contractor under careful supervision, while the linings were built and submitted by leading vault manufacturers.

It is the purpose of this article to discuss only wall construction, and consequently we are interested in the tests only insofar as they relate to walls. Concrete, consisting of carefully graded fine and coarse aggregates and fairly rich in cement, was found to offer considerable resistance to all three methods of attack,—drills, explosives and torch,—when steel reinforcement extended entirely through the walls and at right angles to direction of attack.

In order to study this type of wall further, it was decided to carry out additional tests and also to compare various types of reinforcement. A year later, 1921, a second series of walls were ready for testing. The concrete mixture in all of the second

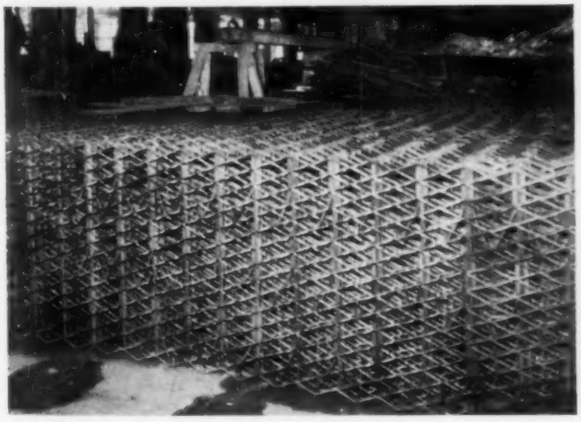


Fig. 1. Vault Floor Reinforcing on Edge, Spaced by Vertical Bars

Fig. 2. Chisel-Resisting Bars Horizontal. Reinforcing Mesh Reversed in Each Layer

Fig. 3. Wall Reinforcing Placed on End. Bars Through the Meshes

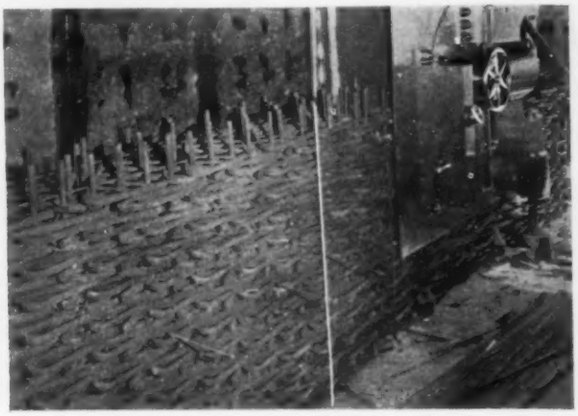


Fig. 4. Reinforcing Frames of Bent Bars At Angles to Face of Wall

series was uniform, but the method of placing and the type of reinforcing varied, a special effort being made to try out materials which were available for use without the necessity of expensive fabrication. Two types of reinforcing, each of relatively low cost, were found to be very effective,—one, a heavy expanded metal, combined with a trussed bar; the second consisting of a series of frames formed of heavy steel bars which were united by smaller members.

A brief description of these two methods, together with a third and somewhat similar system which has since been developed, will, with the accompanying illustrations, show how far vault wall construction has progressed since the tests referred to were carried out. One of these materials consists of heavy steel plates expanded into a diamond mesh, —the diamonds measuring approximately 8 inches long by 3 inches wide. This mesh preferably is laid flat and extends horizontally through the wall to within about 1½ inches of each wall face. On top of this trussed bars are laid at right angles to the wall face,—spaced approximately 8 inches apart,—with prongs formed by shearing portions of the flanges, bent out from the main bar at an angle of about 45°. Similar construction is used for the vault floor and roof except that, to carry out the same theory, the sheets are placed on edge and the bars vertically. Fig. 1, which shows a portion of a vault floor mat 4 feet thick, illustrates this form of construction.

There are several variations from this type of construction, each of which adheres closely to the basic principles of the test walls. Fig. 2 shows ¾-inch chisel-resisting bars laid lengthwise between the sheets and the mesh reversed in each layer. It should be mentioned that in both of these types ¾-inch diameter rods are threaded through the meshes at approximately 1-foot centers. Fig. 3 indicates the sheets in the walls placed on end with rods threaded through the meshes. This type resulted from a demand for a cheaper wall, since it permits of a reduction in steel by using a wider spacing of the sheets. It is of course obvious that when the sheets are laid flat the spacing is determined by the diameter of the separating bars.

One company manufactures reinforcement consisting of horizontal and vertical type reinforcing. The

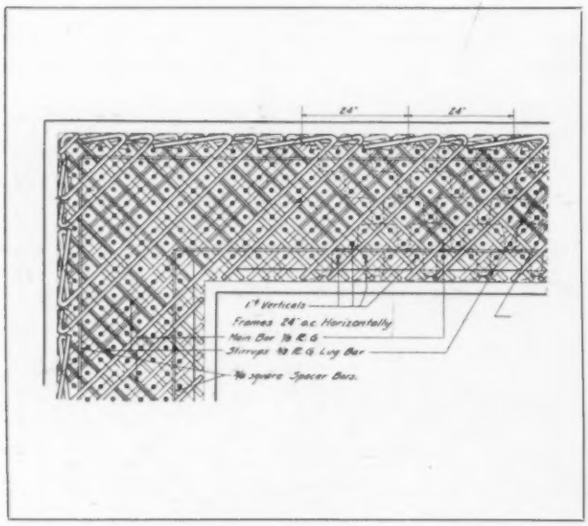



Fig. 5. Plan of Horizontal System of Bent Bar Frames with Verticals

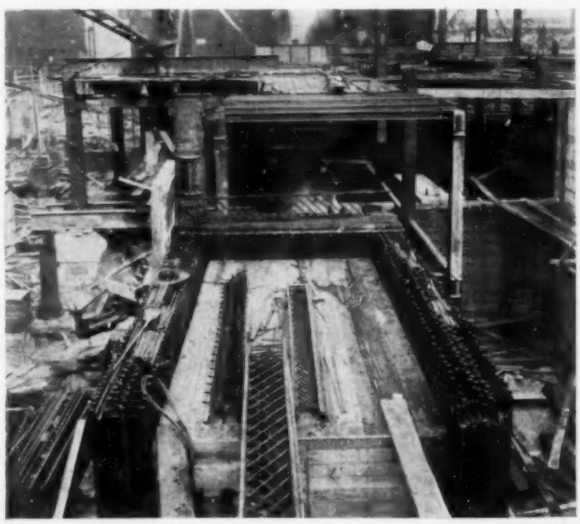


Fig. 6. Vault Under Construction, Showing Vertical Reinforcing

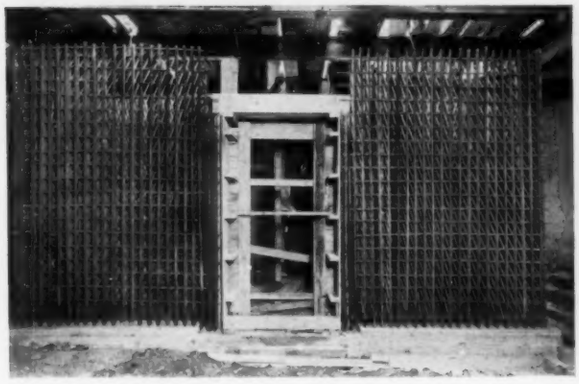


Fig. 7. Front View of Vertical Reinforcing

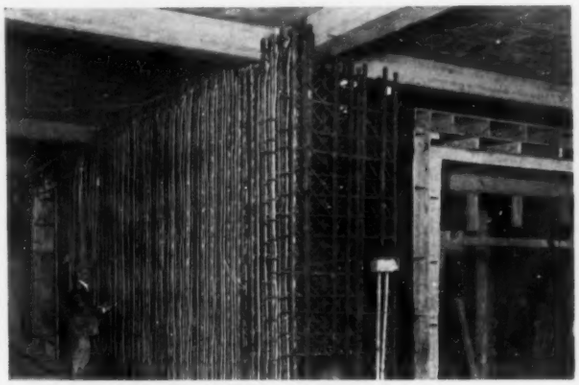


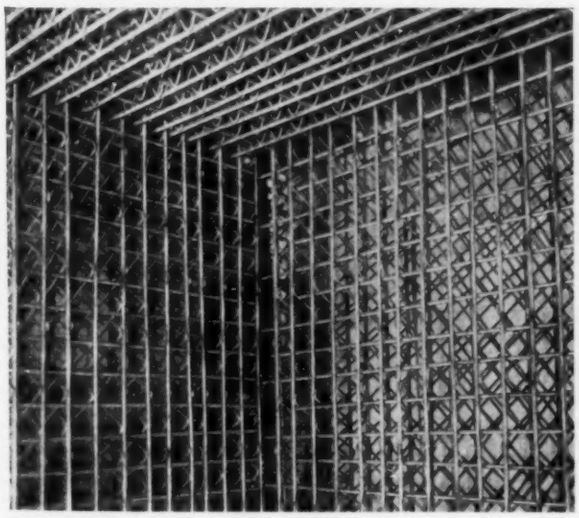
Fig. 8. Showing Placing of Electrical Protection Cables

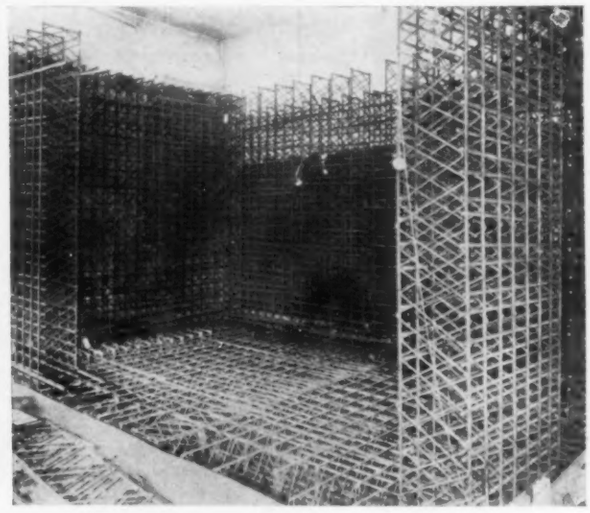
frames for the horizontal type are similar in appearance to sled runners and are laid flat in rows with the bent ends at the outside face of the wall. The axis of every frame is inclined at 45° to the face of the wall and the frames are at 90° to each other. Separators, parallel to the wall, are placed between adjacent rows of frames, and heavy bars are inserted vertically and threaded through the various members. Figs. 4 and 5 show a portion of this type of reinforcing The vertical system manufactured by this company consists of three types of frames designed for heavy, medium and light construction. In all three types round bars are threaded through the diagonal members of the frames. Figs. 6, 7 and 8 show portions of vault walls under construction using this vertical reinforcing.

Within the last few years a third manufacturer, has entered the vault reinforcing field. This company employs a system of frames which is a modification of the bar joist. These frames are generally placed vertically in the walls but may be laid horizontally. Figs. 9 and 10 show two diagrams illustrating this system. In vaults using these types of reinforcing, the steel constitutes from 5 to 9 per cent of the cubic contents of the walls, floors and roof, depending upon the spacing of the mesh, the size of the bars forming the frames, and the spacing of the frames.

The most satisfactory concrete mixture consists of one part of cement, one and one-half parts of sand, and three parts of broken stone or gravel, the stone being graded between the limits of a ¼-inch and a ¾-inch mesh. Experience has shown that in order to maintain a desirable water cement ratio, it is advisable to use an inert material in the mixture in order that the concrete may flow readily. When completely embedded in concrete, these types of construction result in a vault extremely difficult to penetrate, even if subjected to mob attack.

Figs. 2 and 8 show the usual placing of electrical protection cables. These cables are embedded in the outer face of the concrete and thus provide the first line of defense. In conclusion it should be mentioned that since the development of these reinforcing systems the National Bureau of Casualty and Surety Underwriters has given its No. 10 Classification to vaults without linings when constructed with walls, floor and roof 18 inches or more in thickness, reinforced with mesh or frames of the types shown, spaced at certain specified intervals.





Figs. 9 and 10. Reinforcing System Employing a Modification of the Bar Joist

# DETERMINING THE BANK'S REQUIREMENTS

BY

FREDERIC C. HIRONS

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IN ORDER to start the drawings and specifications for a bank building of any type, it is of the greatest importance that the architect have a conference with the building committee and decide certain details. The architect is fortunate if he has a small building committee that will pass on these various matters and make prompt decisions. There are three things that come in the planning and designing of any building that it is well for the architect to make clear to his clients. They are, (1) the requirements of the building in regard to its size; (2) its cost and (3) the materials to be employed in its construction. The client can decide the first two, but he will have to leave it to the architect to tell him what the materials should be. To start the planning of a building in the most efficient manner, an architect should thoroughly familiarize himself with the type of the bank, trust company, savings bank, national bank or private banking company, its methods of doing business, number of accounts, etc.

A list of requirements and questions upon which the architect should have definite information and decisions should include:—

1. Number of officers who will occupy the officers' space on the main floor of the bank.

2. Number of committee rooms or private offices desired, with the approximate sizes of each.

3. Number of tellers and wickets.

4. Are tellers both paying and receiving, or are paying and receiving accounts separate?

5. Number of bookkeepers. Number of stenographers. If it is a large bank, the bookkeepers are usually placed on a floor apart from the main banking room, as there is considerable noise involved in their work with the adding machines. It is advisable to use some sound-absorbing material that will deaden the noise in the working quarters, and thus greatly increase the efficiency of the working staff.

6. Number of men employes and number of women employes, so that provision can be made for locker rooms and toilet facilities.

7. Safe deposit department requirements.

8. Sizes of vaults. In large banks it is considered the best practice to have a separate vault for the bank securities, aside from the safe deposit vault. In the security vault, the number of money chests and lockups required must be determined. In the safe deposit vault, the number of boxes of each size desired must be ascertained. These boxes will vary in size from 1 inch by 5 inches by 2 feet deep to practically a small safe. In obtaining information about the number of boxes, the banker should give the architect concise and accurate information as to the number, sizes and type of these boxes, and also the provisions which should be made for growth.

9. Number of coupon booths,—individual or double,—and the rooms of various sizes that can be used for corporations, payroll rooms, or for committees of public institutions, trustees of estates, etc. How many officers and attendants are in charge of this department?

10. Is a trunk storage vault for silver, etc. desired?

11. Should a vault for fur storage be provided? What type of temperature regulation is desired in the fur storage vault?

12. Are any dining room accommodations needed for the employes during noon hour? In some of the larger banks in the great cities, it has been found desirable to keep employes in the bank during the whole day. With that in view, some banks supply luncheon for their staffs.

13. Number of directors, so as to determine the size of the directors' room.

This list in a general way will give the preliminary information that is necessary for the architect in relation to the banker's idea as to the amount of money he wants to spend, the size and requirements of the building, and the material and equipment. The architect should request that the surveyor for the bank or superintendent obtain definite information for the architect's use. This is a questionnaire that this firm gives to the bank surveyor, requesting him to fill in the information on each question. This will save considerable time and greatly facilitate getting out the drawings.

*Expansion.* One of the most important items in the preliminary study of a bank is the question of future expansion. A bank should have the possibilities of 100 per cent expansion over its current needs. It is an absolute fact that the businesss of a bank will greatly increase when it gets into its new quarters, and it is a common ocurrence at the end of ten years for a bank to need more than double the facilities it had at first.

*Contracts.* From practice it has been found that the best results are obtained by making three contracts for banking work, — one for the construction of the building itself; second for the interior equipment, which includes banking screens, finished floors in the banking room, electric protection for daylight hold-ups, bells, pneumatic tubes, etc.; and the third contract for the vaults and vault equipment. For the protection of the vault, the banker will probably have some definite ideas. The contract for the building should be let first. The contract for the vault second, and the interior equipment contract last. The chief reason for letting this equipment contract last is that it gives the architect and the banker time to study carefully the minute details.

# ELECTRICAL PROTECTION FOR BANKS

BY

DUGALD A. SHAW

BANK EQUIPMENT ENGINEER, WEARY & ALFORD COMPANY

A DOUBLE-HEADED question disturbs the ordered thoughts of almost every banker today: How can he keep the doors swung wide in public welcome, and still keep out the gunman? His contacts with customers, more personal than they have ever been, have stimulated competition among architects and the manufacturers of bank equipment to lower the counter screen,—approaching, as it were, without quite arriving at a form of cafeteria service so much desired by a less welcome visitor,—the bank bandit! That gradual elimination of barriers between the teller and depositor marks a changing status of the bank. Its use is no longer limited to a select circle of the financially well-to-do. Everybody is invited, even the successors of the late Jesse James. It is curious how men of the bandit breed occasionally acquire a halo instead of a noose, for rascality paraded under picturesque names is rascality still. Perhaps the popularity of a Jesse James is due to the fact that "he got away with it." Had he fallen from his horse and started to run, we might hear less of a proposed statue to his memory. But shout "Stop thief!" and people will become a mob, a herd, with the jungle urge to hunt. A thug chased by a crowd knows that he had better throw his gun away, and thereby hangs our tale.

Styles change, even in thieving. A decade ago it was burglary; since the war, holdups have been the popular sport. The record of the past 20 years, according to the American Bankers Association, shows that bank burglaries outnumber holdups, although more is heard of the latter as they are more sensational,—more romantic! The banker gains nothing from report of a burglary, so there is no broadcast if he can prevent it. If he would consult his own interests, as others consult him, and listen to the insurance underwriters, the banker would learn that they say in unmistakable language that the problem of burglary protection resolves itself into two phases:

First,—prevention or interruption of an attack through prompt detection of the burglar's presence.

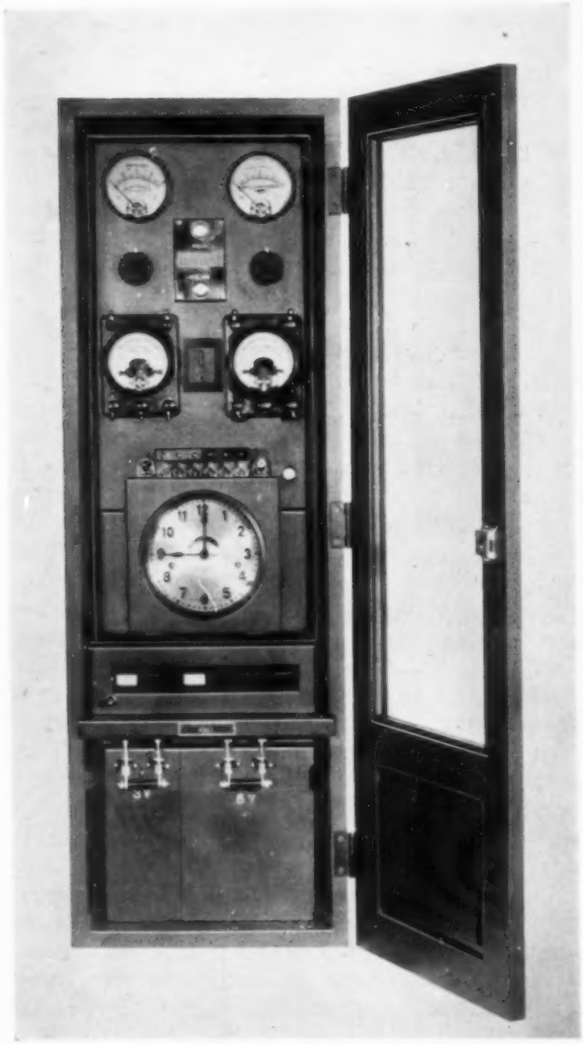
Second,—mechanical resistance to an attack.

The first recommendation means only one thing,—good vault equipment. The heading of this article is its complement. In the two recommendations combined is an answer to the banker's question: How can I keep out the gunman and still throw the doors wide open to the public? We make that assertion without qualification and knowing full well that there are other forms of defense,—gas, turrets, bullet-proof shelters, sawed-off shotguns,—all dangerous playthings and a menace to the law-abiding as well as to the law-breaker.

Until the middle of the nineteenth century the locksmith had not developed his craft rapidly. The Egyptians had a lock with wooden tumblers, which was clumsily imitated by the Romans. Mediæval goldsmiths relied mostly on bolts, bars and armed guards. One hundred years ago the key for a good strong-box lock weighed about a pound. A crime wave following the Civil War demonstrated that there was no such thing as an unpickable lock in this country. The combination lock was invented, and the burglar was surely beaten,—for maybe two years. Threats, backed up by the muzzle of a gun, or a charcoal brazier, forced the cashier to reveal the combination, and as the result of a demand for forms of defense not dependent upon human frailty, the time lock came into being, and with it came doors so well fitted that the joints were proof against the insertion of gunpowder. We of today laugh at those "well fitted" vault doors, and so did the yeggs of yesterday upon the advent of liquid explosives. The next defense was an automatic bolt-opening device, a self-controlled apparatus with all the mechanism on the inside of the door. The door itself was steadily improved in construction to resist attack from the newer and more powerful explosives. Then came the torch; and burglary was back on the front page. Weapons of attack and means of defense in this never-ending warfare remind one of the race in naval armaments; the Merrimac and Monitor, battleship and submarine, U-boat and depth-bomb. Methods of defense cannot remain static. The vault manufacturer and lock maker had contributed their best in the form of stronger and better built doors, in the development of torch-resisting and drill-resisting metal, in more cunningly constructed locks. Reinforced concrete had also taken more defensive shape. The lines were holding, but there were, and still are, hundreds of outlying banks without the wherewithal to buy new vault work. Those banks are in bad defensive shape against an attack from the gang,—organized crime; savagery with the weapons and equipment of science and the cunning wherewith to use them.

Reinforcements came from an infant science. Electricity had cast off its swaddling clothes. Why, people might even use it for cooking; it would possibly supplant horse power as a means of transportation! Electricians sprang up in droves. Out of the ruck came the first burglar alarm. Bank robbery was a popular form of sport in the newer territories, and the first practical burglar alarm was a contribution from the open spaces, from the stamping ground of Deadwood Dick and his kind. The principle of that early alarm, more highly developed of course, forms the basis of most of the systems of electrical protection used today; that is, the surrounding of the vault with devices to surely cause an alarm in case of attempt at forcible entry.

Compared with present-day models, the early types



Typical Control Cabinet Showing Relays, Automatic Re-set Instrument, Timer, Indicator, Etc.

were in a class with the horseless carriage,—but they did the work. They were mysterious, there was no telling what it was all about, so the yeggs usually passed up the banks so protected and picked the soft banks. The original intention was to summon the police, but an attack on a bank in the earliest days of electrical protection gave a hint of a totally different effect. One winter night a gang of yeggs entered a bank in Nebraska, seized, gagged and bound the watchman, placing him in a chair thus trussed with a facetious invitation to "see how it was done." What happened when they started to force the vault, is best described in the words of the watchman who was still tied up when found there next morning. "Say," said he upon the removal of the gag, "when the alarm went off, them fellers never even stopped to say good-bye." Overcoats, mittens and tools left in the flight backed up his statement; and nobody else in town had heard the alarm!

Two general types of electrical protection, both originally designed to summon the police, are in use today: (1) the silent alarm; (2) the local alarm. The first warns the police by means of a line to headquarters, to a local police station, or to a central agency which sends its own armed riders and in turn relays the news of an alarm to the police. The second type sounds a loud alarm on the premises, inside and outside the building, so that everybody in the vicinity will hear it. Those two methods, in one form or another, are the basis of all the types of electrical protection listed in the Burglary Manual. The police alarm, or silent alarm, is perhaps peculiarly of value in states which are organizing *vigilantes,*—strong armed citizens, taught the use of sawed-off shotguns, who will spring to arms at a summons from the bank and work with the local police in rounding up the robbers.

Making the defeat of a burglary or a hold-up dependent upon the capture of the crooks looks like a tactical error to the writer, from the individual banker's point of view. As an auxiliary to the local alarm it is to be recommended, but we are reminded of that first turn at sentry duty when the sergeant quotes from the instruction book to report all suspicious circumstances to the corporal of the guard and adds out of his own experience: "Don't think you are the whole blankety army." The fact that the bank was "protected" would, of course, reduce the possibility of attack.

When the local gong goes off, the whole neighborhood knows about it, and so do visitors, welcome or otherwise, even though it be a false alarm; and even though there be a dozen false alarms, the gong would still do its real work, for it is a curious fact that the virtue of the local alarm is no longer that of a police summons. Its continued use has brought to light that no burglar or hold-up man can stand for a single instant against the sound of an alarm. This would differentiate the "local" method from others as a reliance upon psychological reaction rather than upon physical action. The clang of the gong is the howl of the bogey man, the Cro-Magnon on the rampage, the drum call of the jungle that the hunt is on. Have you ever seen a close-up of the end of a man hunt? It is not a lovely sight. The hunted knows there is no pleasure in it—for him! Outside is the driver of the car with the engine running. Should he elect to save his skin, and if he has the immediate means, the jig is up for the others. They know it, and police records bear it out. Those inside gongs are intended to stimulate the racket outside, to make sure that the gangsters hear the alarm; and when they do hear it they are on their way; nor do they stand upon the order of their going.

Out of a number of attacks where abandoned attempts showed evidence of flight without any known alarm, we cite one that happened in an Iowa town. The cashier of the bank called the bank on the telephone, and, getting no answer, hurried down to find that a burglar gang had forced the door of the vault and had started on the safe, but had quit the attempt

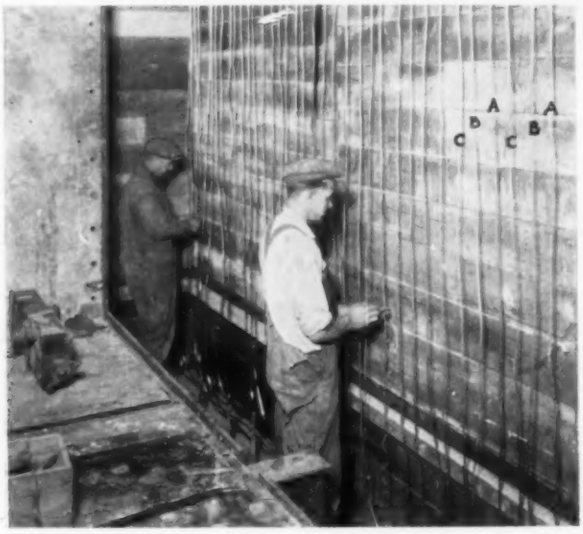
and skipped. Nothing other than the ringing of the telephone had caused their precipitate flight. Electrical protection is the modern equivalent of the watch dog,—a sentry,—something that will give warning that marauders are aprowl. It is not, however, a substitute for vault work, nor is it likely to take the form of live wires designed to give the thief a shock should he attempt to leave finger prints on the vault structure. That kind of thing is ruled out. An employe working overtime, the watchman on his nightly rounds, an industrious charwoman, would be the likely victim in any electrical equivalent of the mantrap or spring-gun. The gong on the outside of the building acts as a deterrent simply by its presence there, for the potential yeggs can see that the bank is "protected."

In highly specialized electrical equipment, there are, needless to say, many patented devices, but the working of an alarm system is nobody's secret. Out of what might be termed the "age of confusion" in burglar alarms, two types survived; in one type a grille work of cables was used, and in the other the protective feature was a "lining." In the cable type, lead-covered wires or cables are embedded in the masonry at the time the vault is built, tests being maintained continuously during their installation and also during the pouring of the concrete. The wires are set at approximately 3-inch centers and hooked up on different circuits, the number depending on the size of the vault, in such a manner that no two wires of the same circuit are adjacent to one another. In the event of a faulty circuit, the distance between live wires will never be more than 6 inches. Linings are installed either on the outside or the inside of the vault, the latter more adapted to existing structures, in the form of a special sensitive material described as an "open and closed circuit lining," which in turn is covered by light steel plates to protect it against any accidental penetration that would consequently cause a false alarm. Another form provides a grille work of closed-circuit wires protected by some form of envelope other than steel, such as plaster, or other fairly firm and protected materials. Those who have taken part in or supervised the cutting of hard concrete know that it means sledge hammer work or use of explosives. The forcing of a vault, therefore, without breaking cables or penetrating the lining, is not even probable.

There are two standard methods of protecting the door so that an alarm will sound in case of an attempt at a forced entry. One method is by applying heat-sensitive contacts to the inner surface of the door, which act upon the same principle as the sprinkler heads in a fire-protection system. A moderate degree of heat closes an open circuit in one or more of the contacts nearest the point of heat and sets off the alarm. Another method is to embed an "electrical lining" in the doors under either the outer or inner finish plate. This method requires the coöperation of the vault manufacturers and is standard practice, but is not practicable when the door is already in place. In both methods of door protection, alarm contacts are placed upon the door bolts to cause an alarm should the bolts be out of, or moved from, a locked position. In some cases additional protection is provided,—although not demanded by the underwriters, who are only concerned with forcible entry,—by placing contacts on the door locks. For doors of moderate thickness, the first method, the heat sensitive contacts, would appear to be preferable as least expensive, and for heavier doors the second method, the concealed lining, is recommended. A lining under the inner plate is not so good, since the attack would have to practically ruin the door to reach the lining. All the vault manufacturers are equipped to prepare their doors for electrical linings, and the additional expense involved in the purchase of new vault work is a comparatively small item.

Bank Teller Giving Alarm by Foot-Rail Contact

The instruments used in the control of the system, —relays, timers, indicators,—are assembled in a cabinet, which is located for protection inside one of the vaults, preferably in the vault that, in accordance with the bank's established practice, is the last to be closed. Since an alarm system must be self-contained and self-protecting, it must also be self-controlled, as otherwise it could be turned "on" or "off" at will by anyone desiring admittance, whether it be the head of a gang or the head of the bank. There must also be some form of automatic control whereby the system will be disconnected from the night burglar alarm in the morning, switched on for day-raid




Setting Cables for Wall Protection, A, B and C Are Separate Circuits on Approximately 3-inch Centers

duty, then back again for the recognized hours of thievery. In some systems this is done by using a time lock similar to that used by the vault manufacturer for the time-control of door bolts. Bankers who have suffered damaged nerves as a result of a "lock-out" know that a timer which must be set every day is dependent upon a memory frequently harassed by financial problems. The "eight-day clock" as used by makers of one of the standard systems, the "continuous-running timer," as it is described, does not depend upon anybody's memory. It gives a "winding warning." Like the neglected young of the human species, it makes more noise yet, and keeps it up until somebody does pay attention!

How long does the alarm ring when it goes off? In the best systems, about 15 minutes. Some used to go all night, and maybe some still do so. If anybody in the neighborhood is not aroused by the din of a rapid-fire gong in that time, he is probably sleeping it off. One thing is certain: the yeggs would be off too. Suppose, however, that they had tripped the alarm with malice aforethought, one might ask, and returned to "pull the job" when the citizenry had retired and the police were on their third game of checkers,—what then? Well, if it were out of commission in the first place, the yeggs would not waste any further time on an experimental alarm. If they thought, further, they had put it out of business for the night by turning in a false alarm, they would be badly fooled provided it were equipped with an automatic resetting device. This feature is not demanded by the underwriters and it is a proof that some manufacturers have set a standard for themselves that will more than meet the requirements of the underwriters. The resetting device will stop the ringing of alarms (from any cause) at the end of a specified time,—from 15 to 20 minutes,—and automatically re-set the alarm system for another attack.

The latest development in burglar alarms, and one that has only been perfected within the past few years, is the sound-sensitive alarm. It takes the place of cables and sensitive linings for the walls, floor and ceiling. The controls, door protection and alarm mechanism are practically the same as for the cable type. Sound-sensitive detectors,—the size of the vault determines the number,—are fastened to the walls or ceilings like so many wasps' nests. They are, in effect, microphones. There is nothing new about the theory of the sound wave. Cry "boo" when you see a grasshopper feeling the air with his antennæ, and watch him jump. Do the same in a vault equipped with a sound-sensitive system, and the indicator will dance with joy. Wait till the alarm is turned off, however, before making such a test. That such a system must be fool-proof, super-efficient as it were, is self-evident. In actual commercial use over a period of years, it appears to be completely successful. It has a special appeal for the architect and builder in that its installation, aside from a few runs of conduit, can be deferred until most of the other sub-contractors are out of the way. The noises of an attack on the vault structure are caught by the "mikes" and the disturbance, stepped up, is relayed to the gong. The "mikes" are also sensitive to the snapping of torches and other vibrations produced by an attack on the vault doors, although not affected, —at least not enough to cause an alarm,—by vibrations originating outside the vault from street cars, trucks, machinery and things of that kind.

The banker and his architect, having in mind the purchase of vault equipment, will hear much talk of the Underwriters' Laboratories, of "Class No. 10 Vault Construction," and of "Grade A Electrical Protection," therefore a few words of description. The Underwriters' Laboratories is an organization maintained by the underwriters of insurance to serve as a central testing station where products designed to prevent fire, theft, robbery and burglary or to protect property in general, can be investigated and their merits ascertained. The classifications for vault construction were not determined by laboratory tests but grew out of what was considered good practice,—in the days before the invention of the cutting torch. Class No. 10 is the highest standard of vault construction recognized by insurance companies and one which entitles the owner to the maximum discount based on physical equipment, or, as they term it, "mechanical defense." It is exemplified by the vault having 18-inch reinforced concrete walls, a steel lining half an inch thick, and the standard 10-inch door. Neither heavier and better looking doors nor stronger walls get a better rate,—yet. Grade A is the highest form of electrical protection recognized by the underwriters of insurance and entitles the owner to a 65 per cent discount on any rate for burglary insurance based on physical protection, even that for a Class No. 10 vault. It was established by tests at the Underwriters' Laboratories. It would appear, then, that the people who insure against burglary must think fairly well of electrical protection. They make this distinction between

physical protection and electrical protection, however. A 10-inch door built 20 years ago is still in Class No. 10, whether the builder is still in business or not. Manufacturers of electrical alarm systems must pay a yearly fee for each model approved, to keep it approved. If the manufacturer goes out of business and no similar concern takes over the responsibilities and care of his models, they come off the list of approved systems, and the 65 per cent comes off the list of approved discounts. Before asking for bids for his client, the architect will be well advised to consult the "Who's Who" of burglar alarm manufacturers.

Specifications for electrical protection can of necessity merely outline the general requirements of a system to be selected, one that has been developed by the manufacturer and passed by the Underwriters' Laboratories. Any arbitrary demands in the specifications might mean trouble over insurance premiums and would certainly be an invitation to argue as well as to bid. A comparison of the relative merits of the various systems is something else, and should be a determining factor in the awarding of a contract. Some systems just "get by" the underwriters, and others provide a scope of protection much in excess of those standards. The essentials of a system of electrical protection against burglary and holdup are outlined in these paragraphs.

1. The purpose of that part of the system of electrical protection embracing defense against burglary is that an alarm will sound or be turned in automatically under any of these or similar conditions:

(a) An attack on the vault walls, ceiling, floor slab or door by torch, drill, explosives or other burglarious means.

(b) An attempt to open the vault door at other than regular working hours or in a regular manner.

(c) Any attempt to cut the wires forming a part of the installation,—the lead to the gong for example.

(d) Any tampering with the alarm gong, if it be a local alarm.

2. In the event of a holdup, the alarm is set in motion by manual contacts—push-buttons, or by some variation of that process; a foot-rail, for example.

3. In electrical protection for a night depository, there is no choice of type; the cable system is used.

After the awarding of the contract, the work will, for the greater part, be covered by the specification head "Coöperation with Other Trades." The manufacturer should be kept informed of the progress of the building operation in order that he have his material on the site in time. This is generally done in two parts, viz.,

(a) Cables, conduit and other concealed parts which are installed early.

(b) Visible equipment,—controls, push-buttons, alarm gongs,—which are installed shortly before the keys are turned over to the owner.

Experience dictates that the conduits should be furnished and installed by the owner, that is, that they be included in the electrical contract. It would eventually come around to him, however it were handled, and it is standardized material.

There is one item of burglar alarm equipment that the architect cannot blink at, and that is the location of the alarm gong. It is enclosed in a heavy steel housing, emblazoned on the front with the legend "Burglar Alarm," pierced with louvres to let out the sound, and so anchored to the wall that only an explosion would dislodge it. How the architect loves signs, clocks, or bird houses of any kind plastered on "his" building! That gong housing on the outside of the building for example,—let's stick it around in the alley or back of the parapet where it won't be seen. It can't be done. One of the unalterable,—the architect might call it "unutterable," —commands of the underwriters is that the gong housing be so located that he who runs may read the inscription "Burglar Alarm," and that nothing be done to blanket the sound of the gong. Furthermore, they specify that the gong be placed from 15 to 25 feet above the sidewalk. They have unbent so far recently as to decree that an alarm housing may be recessed, provided that such will not muffle the sound of an alarm and provided further that any grille in front of the gong housing may readily be removed or opened for an inspection of the housing and its contents "without difficulty" by the Laboratories' representative or by factory inspectors. The architect must make up his mind early in the development of his elevations that the gong or other alarm housing will appear somewhere on one of the main elevations. If he leaves it to a mechanic who thinks in terms of burglar alarms and not of architectural orders, there is no doubt that it will meet the requirements of the underwriters,—but how!

In calling for bids, and before awarding the contract, the experienced architect will ask in effect: "Who are you, and what have you? Is your system sold outright, or is it rented?" If the work be included in the general contract, as is sometimes done even for the vault itself, the contractor will more than likely buy "for a price," and the difference in price between the best alarm equipment and something that will just get by, is a matter of a few hundred dollars at the most. Bearing in mind that the protective value provided by a first class complete alarm system is so much greater per dollar of cost than is afforded by any other protective measure, the price is of relatively less importance than is the type of system, the quality of the equipment, the nature of service to be rendered, or the standing of the manufacturer. The approval of the Underwriters' Laboratories is, of course, essential on account of the large discounts allowed for an approved system. The best systems, however, provide a scope of protection in excess of those demanded by the underwriters who are concerned only with a forcible entry. In a chart representing bank losses from all causes, including burglary and robbery, that sector colored to indicate embezzlement and "inside jobs" makes

quite a splash. There is also the factor of carelessness. Few householders have not, at some time or other, left their doors unlocked, and the same thing happens in the best regulated banks as to vault doors.

The most complete local alarm system with which the writer is familiar effectively guards against the leaving of the vault unlocked overnight and also protects the combinations and time locks from disloyal tampering. The central station type also provides means of detecting and correcting such conditions, involving again, however, a dependence upon human fallibility which is the occasion of the condition in the first place. The humble watch dog is introduced as a form of insurance policy. Hire a man to do that kind of work, and the premium for burglary or robbery insurance is immediately discounted. An article of this kind would be incomplete without some data about insurance rates for burglary and for robbery. They represent the insurance companies' reaction to bank defenses.

Here are some culls from the Manual of Burglary, Theft and Robbery Insurance:

1. The basic rate per thousand for burglary on that old time "insulated" cupboard painted black and labeled "Safe," is .....$25.00
2. In "Class No. 10 Vaults" this rate comes down to ..... 2.00
3. For watchman service there is a discount of 10%
4. Territorial discount.

(a) Some states are statistically more law-abiding than others, or at least less open to attack. In Maine and Maryland the territorial discount is .....40%

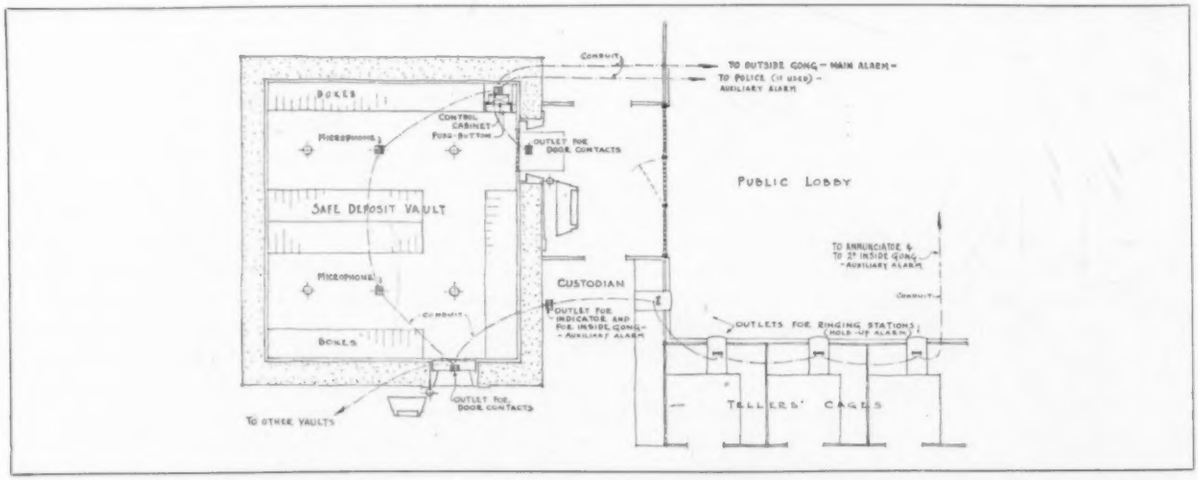
(b) In Illinois and Oklahoma, where there is apparently an open season for bandits, the discount is ..... nil

(c) Parts west, taking in Hollywood, get .. 20%

5. Population discounts vary; as the birth rate rises the insurance rate comes down, regardless of locality. That seems to let out the natives and bears out the claim that New York gunmen do all the Chicago robbing and vice versa.
6. Then comes the discount for electrical protection which, for a Grade A System, regardless of locality or strength of vault, is ..... 65%

Robbery is something else. The best the insurance people will do, even with police guards and holdup alarm, is a 20 per cent discount. There is less at stake, however, in actual cash loss from holdup than from burglary. The stock newspaper statement to the effect that the robbers scooped five thousand in the cages and missed fifty thousand in the vaults does not make the thugs feel badly. They got what they were after,—all the cash in sight,—and they got it while one might hold his breath. The only thing that could keep an organized gang out of a bank during working hours is a cordon of police or a regiment of soldiers. If things should come to such a pass, the securities in the bank would hardly be worth the paper they were printed on. The banker must do his business out in the open in this day and age and, in so doing, must necessarily take some chances as he does every time he steps off the curb. By exercising reasonable caution in crossing the street he may keep his name out of the papers, and by doing the same thing with his bank he may keep the name of his bank off the casualty list.

In the exercise of reasonable precautions the architect should unhesitatingly recommend that his client keep in mind not only the insurance standards for good vault work, but the advertising as well of the potential defense of a heavy door supplemented by a complete burglar alarm system, one with adequate ringing stations to provide alarm in case of holdup; that the alarm system should be selected only after careful investigation and be of a type providing the largest possible scope of protective service rather than one that merely meets the limited requirements of the underwriters, a system furnished by a well known and reliable concern that offers a genuine inspection service. Thus equipped he may invite all his friends to the bank with reasonable expectations that no unwelcome visitors will try to crash the gate.




Plan Showing Conduits and Outlets for a Sound-Wave Alarm System. Hold-Up Alarm Is Operated by Foot-Rails in Tellers' Cages

# THE HEATING AND VENTILATING OF BANKS

BY

PERRY WEST

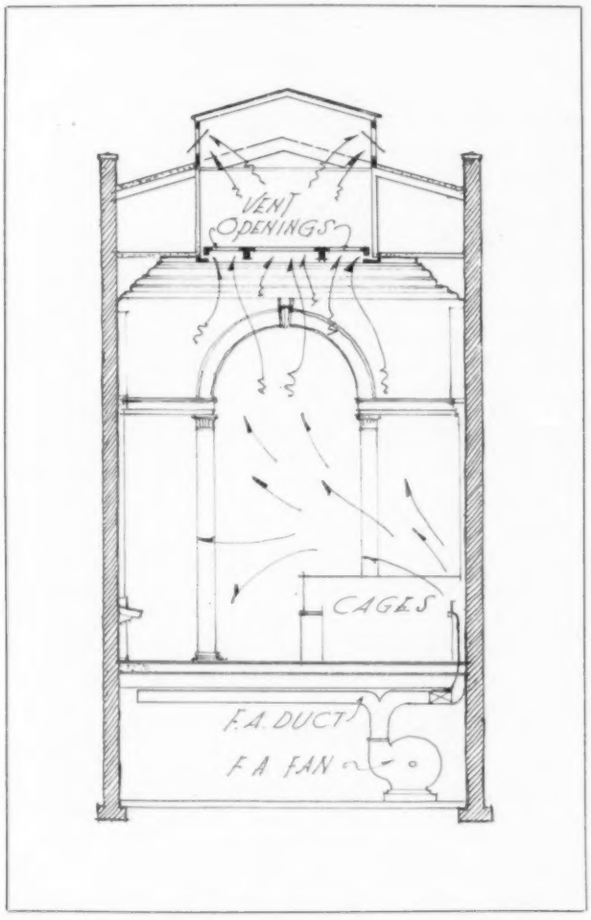
CONSULTING HEATING AND VENTILATING ENGINEER

THE banking building presents a variety of problems for both the architect and the mechanical engineer, not only on account of the diversity of the departments to be provided for and the different uses to which the spaces are to be put, but also on account of the different characters and proportions of the areas to be treated. In the smaller bank we usually have the relatively large main banking room, with its high ceiling and large cubic contents per occupant, and in conjunction with this the cages and officers' rooms, which are less spacious and more densely occupied. The working spaces for bookkeepers and stenographers are sometimes located on mezzanines or galleries around the walls, over the cages. Such working spaces may also be provided adjacent to the main banking room, in basements, or on floors above. There is usually a board room, either with or without committee rooms, sometimes located on the gallery, sometimes in the rear, and sometimes on an upper floor. Toilets are provided for men and women, accessible to the several departments and, in modern practice, with rest and recreation rooms adjacent. Vaults are of course a necessary adjunct to any bank. In larger banks, cafeterias and dining rooms with kitchens, for the working staffs and officers, are frequently added. The working spaces are frequently separated from the main banking room and located in adjacent rooms or in other stories of the building, thus eliminating the galleries in this room. In still larger banks the officers' rooms or spaces are separated from the main rooms and located adjacent to them or on other floors. In addition, such buildings may include concessional spaces for stores, restaurants, luncheon clubs, auditoriums, etc. The building may be extremely high, with elevator shafts and stairs to act as flues for producing drafts and otherwise distributing the proper operation of the heating and ventilating apparatus. The kind of sash to be used, whether double-hung or of some form of casement or ventilating sash, steel or wood, weatherstripped or plain, also has a bearing upon the designing of the heating and ventilating apparatus.

In connection with all of the problems which these various conditions impose upon the proper selection and designing of the heating and ventilating equipment, the first and most important consideration is that the architect should have a thorough understanding with his equipment designer as to the exact requirements to be met, the uses to which the various parts of the building are to be put, and the space requirements for the equipment, the ducts, the pipes, radiators, etc., before the design has progressed beyond the sketch stage. The importance of this can scarcely be overestimated in face of the fact that a recent survey has shown that the heating and ventilating, (especially the ventilating,) in most of our banking buildings are not functioning properly because these requirements were not so worked out, and because the equipment was installed with an attempt to meet building conditions that did not allow the proper functioning of this equipment. The matter of first cost is frequently allowed to interfere with the selection and designing of the proper apparatus, but if our past experiences are to be of value to us in this connection, I should say that after viewing so many examples of improper ventilating, it would have been much better to omit the apparatus altogether and save its cost rather than to install a defective system, which would be soon shut down and allowed to stand as an idle investment. In many cases investigated, much simpler and less expensive systems were installed later to act in place of the systems which did not function, but it stands to reason that the proper kind of a system can be better and more cheaply installed at the time the building is erected.

On the whole, I think we may say that the heating of banking buildings, as it is practiced today, is fairly satisfactory, but that the ventilation is generally poor. The combination of the two is generally faulty, causing drafty, over-heated and otherwise poorly conditioned atmosphere, principally because the specific requirements are not properly worked out between the architect and his equipment designer, and also because the designer is not allowed enough funds for either his equipment or its study and design. There is perhaps a broader field for the improvement of the heating and ventilating equipment of this class of building than in those of many others with which we deal.

*Heating.* The heating may be by steam, hot water or furnace, and the fuel may be coal, oil or gas. With steam or hot water, the heating may be by direct radiation or partially or wholly by indirect or hot blast methods. If the building is purely for daytime banking purposes, steam with direct radiation is perhaps the best, as it will keep the walls warm long after heat is shut down and will tend to offset their cooling effect quickly after it is started up. Working spaces, board rooms, committee rooms and other such spaces as are likely to be used at times when the main banking room is not in use, may be piped on separate systems, or be equipped with auxiliary gas, electric or domestic hot water heating, so that heat may be shut off of the main banking




Upward System of Ventilation, Fresh Air Supply Behind Tellers' Cages

room at such times. Radiators for the main room should be under windows, generally in recesses with grilles in front and over the tops. The newer types of concealed fin radiators are adaptable to this arrangement. Vestibules should be well heated and provided with revolving doors to prevent an influx of cold air, especially in tall buildings. Skylights should be protected with enough radiation to prevent sweating and the dropping down of cold air on the heads of people below. The main room should be under automatic temperature control. While temperature control is desirable elsewhere, and while it generally saves an appreciable percentage of the cost of fuel, it may be omitted, excepting in the main room.

Vaults generally do not require heat, except in special cases where employes are continually on duty and where heat may be necessary to dispel chill and dampness. Warm air or electrical heat is usually employed. The cages where clerks are on duty continually should be well heated and arranged with automatic or good hand control. Spaces around the public desks and in coupon rooms, reception rooms, and other public spaces which patrons enter directly from the outside should be especially well heated, preferably under automatic control. Board rooms, committee rooms, officers' rooms, toilets, rest rooms, recreation rooms, dining rooms and work rooms should be well heated, and with the exception of work rooms and private offices, they should be under automatic control. It should be remembered, in connection with the heating of all purely banking spaces, that the occupants are generally sitting, at very light work, and that with the nervous energy expended and the thin clothing worn, especially by the female employes, a comparatively warm and draft-free atmosphere is required.

In the cheaper class of buildings a one-pipe steam system may suffice, but banking buildings are generally of a character to warrant a two-pipe vapor or vacuum-heating system. Any bank structure of appreciable size had best be equipped with a vacuum system, since the requirements for quick and positive circulation are pronounced in this type of building. Care should be exercised to properly balance the system, so that none of the vital parts of the building, such as the cages, working spaces, officers' quarters, board rooms or private offices, are on ends of long runs, remote from the boiler, where the steam will be lost first and regained last as the pressure is dropped and raised on the boilers.

*Boilers* for small buildings may be of cast iron or steel; for larger buildings steel is most used, and for buildings where great capacity is required in small floor space, water-tube boilers may well be installed. Where a private electric generating plant is to be used, the boilers should be high-pressure, to operate at from 100- to 150-pound pressure, and the heating system should be operated on exhaust steam with a vacuum return system and automatic live steam made up through pressure-reducing valves. Generally speaking, a private plant is not a paying investment when the electric current can be purchased for 2 cents or less per kilowatt hour. Run of mine soft coal or fine anthracite at $6 per ton is 20 per cent cheaper than heavy fuel oil at 5 cents per gallon for the larger plants, and larger size coal at $12 per ton is 20 per cent cheaper than furnace oil at 10 cents per gallon for the smaller plants, not considering any savings in costs of coal and ash handling, which in many instances are greatly in favor of oil burning. The cost to install stokers for coal burning or oil equipment for oil burning will run from 25 per cent to 50 per cent of the cost of the boilers, depending upon the size of the plant, and stokers should save from 10 to 15 per cent of the coal over good hand firing. Coal and the lighter fuel oils (28 to 32 Be) are adaptable to full automatic control of the fire from a thermostat in the main banking room, and this relatively simple and cheap form of temperature control may be very successfully used for the smaller institutions. The heavier fuel oils (14 to 16 Be) are not adaptable to full automatic control and are best used where a competent operator is on duty at all times.

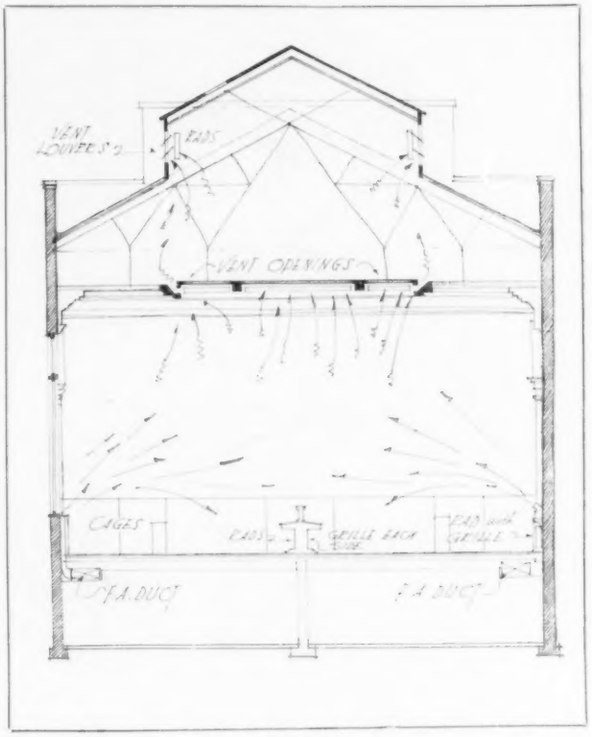
*Hot Water Heating.* This type of heating is not especially adapted to banking buildings unless it is

to be operated fairly continuously, since the large spaces and massive construction constitute too much inertia to be readily overcome by the slow action of hot water. It is easily adapted to simple and inexpensive temperature control, and when properly designed and operated gives good and economical results as compared with a steam system for heating over the same periods of time. Its first cost is substantially the same as for two-pipe vapor or vacuum steam without temperature control, and somewhat cheaper when the water system is operated from one central automatic temperature control as compared with full individual automatic temperature control for a steam system. Hot water is not so well adapted to buildings over five stories high, on account of excessive pressures on the radiators unless the system is divided into vertical sections.

*Furnace Heating.* Wihout fan circulation this from of heating is not suitable except for small banks, but with fan circulation it may be extended to a moderate sized building. It has the advantages of low first cost, combining heating with ventilation, quick response, and the elimination of radiation. Care should be exercised to avoid a type of construction that may leak dust or gases from the furnace into the rooms, and also to get a type with automatic humidifying apparatus for preventing excessive dryness in the overheated air, especially near warm air inlets. Furnace heating is not especially efficacious in warming up the cold walls of large rooms, and it is susceptible to disarrangement in operation by wind and by the chimney effect of the building.

*Indirect or Hot Blast Heating.* This has substantially the same advantages and disadvantages as furnace heating, except that the hazards from gas are eliminated, the dust nuisance is not so great, and the conditions of the air may be more fully controlled.

*Ventilation.* The ventilation of the main banking rooms in small banks has not, until quite recently, received much attention, except to depend on the windows and doors. It has been found, however, that with the increasing dust and automobile smoke of the outside air, especially in the larger cities, this method is quite destructive to books and records and that a great saving is effected by the use of artificial ventilation and air cleaners. The spaces in and around the cages, the mezzanines, galleries, coupon booths and any other small rooms are the only areas within the main banking room which generally require ventilation, except in the larger institutions. One problem, however, is how to introduce and remove enough air from these spaces without creating drafts. Another problem, which becomes increasingly difficult of solution as the sizes of the rooms increase, is that the inside temperature is considerably lower than the outside temperature in summer, so that the air introduced is not only disagreeably warmer, but becomes cooled and therefore more humid, frequently to the extent of depositing moisture or preventing the evaporation of perspiration, thus causing papers and books to feel sticky, blot

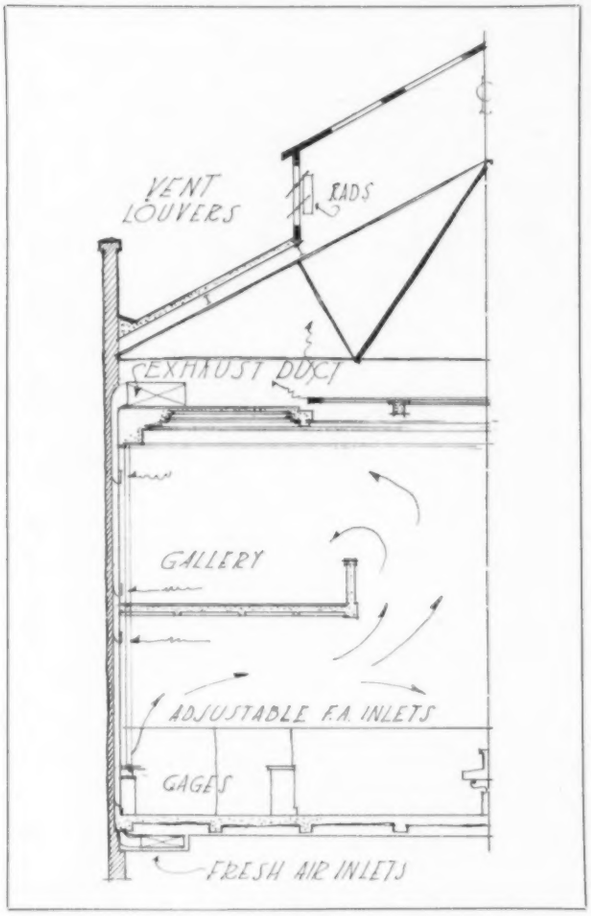



Upward Ventilation and Direct Steam Heating System for Large Bank

and become soiled. The only proper solution of the latter problem lies in the use of refrigerating and dehumidifying apparatus for decreasing the moisture contents of the air to a point considerably below the dew point of the inside air, and then in reheating this air, even in summer, to a point not more than 5° Fahr. below the inside temperature, in order to prevent drafts. This process is expensive and requires heat even in summer, but it should be carefully considered before going ahead with any other kind of a ventilating system for the main banking room.

In cases where the size of the room or the character of the work does not warrant this treatment, the air may be first passed through filters, thence through automatically controlled heaters, and then to the spaces to be ventilated. It should be delivered well above the heads of the occupants, and for cages it should be directed upward and outward at an angle so as to prevent drafts. Where possible, it is advisable to bring this air in along the window sills, directed upward for winter (so as to meet and diffuse with the down-falling cold air), and outward for summer so as to afford air movement for cooling. Adjustable outlets are preferable in any case, so that the angle of the air stream may be varied to suit conditions and even directed outward and downward for summer cooling.

Where there are no mezzanines over cages, the foul air may be exhausted through skylights in the main ceiling, either by mechanical or natural means, or through grilles and flues where no skylights are




Upward System of Supply and Exhaust Ventilation in Banking Room with Gallery

available. Where mezzanines exist, a portion of the foul air should be exhausted from the rear of the cages near the floor so as to establish a local circulation, while the greater portion may be exhausted from around the walls of the galleries near the ceilings, so as to afford a circulation for these. It is also well, in connection with both the exhaust from the cages and from the galleries, to have both bottom and top grilles provided with adjustable louvers so that the air may be removed from near the floor, from near the ceiling, or both, as required.

Coupon booths and other small rooms, without windows, within the main banking room should be provided with separate systems of exhaust ventilation and have louvered doors for admitting air from the main room. Where this kind of ventilation is inadequate, the best solution is to treat the entire main banking room as a unit; introduce tempered air in winter and dehumidified and cooled air in the summer through a multiplicity of grilles with proper diffusers in the ceiling, and remove the foul air through grilles around the walls near the floor. Separate exhaust systems should be provided for coupon booths and other small rooms as was just explained. Conditioned air should also be supplied through the ceilings under any galleries over cages, and foul air should be exhausted from near the floor around the walls of any galleries. This kind of a system is sometimes designed to operate as an upward system by introducing the air around the walls, from under seats and platforms, and through window sills and jambs, the foul air being removed through grilles in the main ceiling and in the ceilings under galleries; but it is invariably found that this is a difficult system to handle without creating objectionable drafts. The principle of upward ventilation appeals on first thought as being the natural and easier method, especially for summer, but inasmuch as the air must frequently be cooler than the room in winter to prevent overheating, and should be cooler than the room in summer to prevent sweating, the introduction of the air at the floor usually causes complaints of drafts. If the air can be introduced upward through window sills and ledges around the walls, with adjustable outlets, the conditioned air method may be used as described for the raw air method, but on the whole the downward system is usually preferable. Remote push-button control of the ventilation for cages and small room systems is advisable in order that attendants may easily adjust the ventilation to suit conditions.

*Toilet Room Ventilation.* This should be entirely separate from the remaining ventilation and may be by gravity or mechanical exhaust with louvered doors for admitting air from adjacent spaces. Where obtaining a natural supply is not feasible, an artificial supply of cleaned and tempered air should be employed, but care should be exercised to have the supply less than the exhaust. Remote push-button control with interlocking arrangements, so that supply fans cannot be run without exhaust fans, is advisable for toilets. Ventilation for toilets should provide from 12 to 20 air changes per hour.

*Rest and Recreation Room Ventilation.* This should be separate and similar to that for toilet room ventilation, except that the supply and exhaust may be about balanced and interlocking control features omitted. About six air changes per hour should be provided.

*Ventilation of Working Spaces.* This is variously treated according to the density of occupancy, nature of work, kind of employes, i. e.,—men, women, boys or girls, available funds, and character of the space. These general rules can be laid down:

1. Each floor or section of floor, or in some cases two or three floors (wherein the same kinds of activities are housed under the same management), should be provided with a separate system. This applies particularly to supply systems, but may with best results be extended to exhaust systems, although many floors of the same institution may be connected to the same exhaust system. The ventilation of working spaces should not be combined with other ventilation, nor should separate and dissimilar departments be combined, especially where they are under separate managements, since their requirements and ideas are different. The most satisfaction is given when

each department has control over its own ventilation, especially over the air supply. The ventilation of these spaces, or of other parts of the banking company's quarters, should not be combined with the ventilation of rentable portions of the building.

2. Air supply should be from side outlets near the ceilings, preferably with adjustable outlets for directing the air current upward or downward. The exhaust, if employed, should be from side outlets near floors and ceilings, with adjustable louvers so as to exhaust from either or both points.

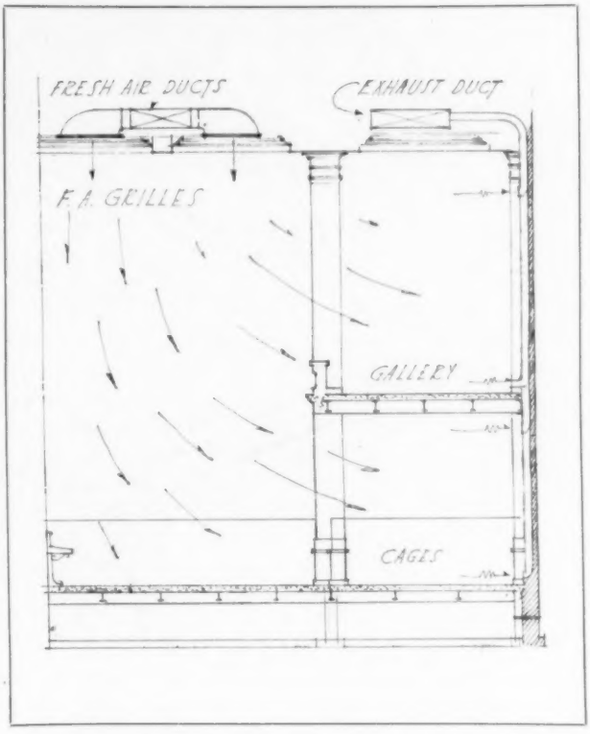
3. In basements there should be an exhaust as well as a supply system for removing the excessive heat in summer. On upper floors the exhaust system may be omitted, and skylights, ventilators or even the natural leakage through windows and doors be used, but in the better class of closely occupied spaces a mechanical exhaust system, or at least an adequate gravity system, should be employed.

4. The air supply should be filtered and automatically tempered, and to cut down operating expenses a recirculation system may be employed. The recirculated air is introduced from the rooms at a point just ahead of the heaters, so as to deliver the air to them at a temperature of about 50° Fahr. by mixing the recirculated air with the fresh air. This should operate under automatic control from a thermostat just ahead of the heaters, which would automatically deliver 100 per cent of fresh air at 50° and above,—and would recirculate more air as the temperature outside falls, up to about two-thirds of the total quantity at 0° Fahr. outside.

5. The air supply may range anywhere from 10 to 30 cubic feet per person per minute and from .5 to 1.5 cubic feet per minute per square foot of floor space, with an exhaust of from 80 to 90 per cent of these amounts.

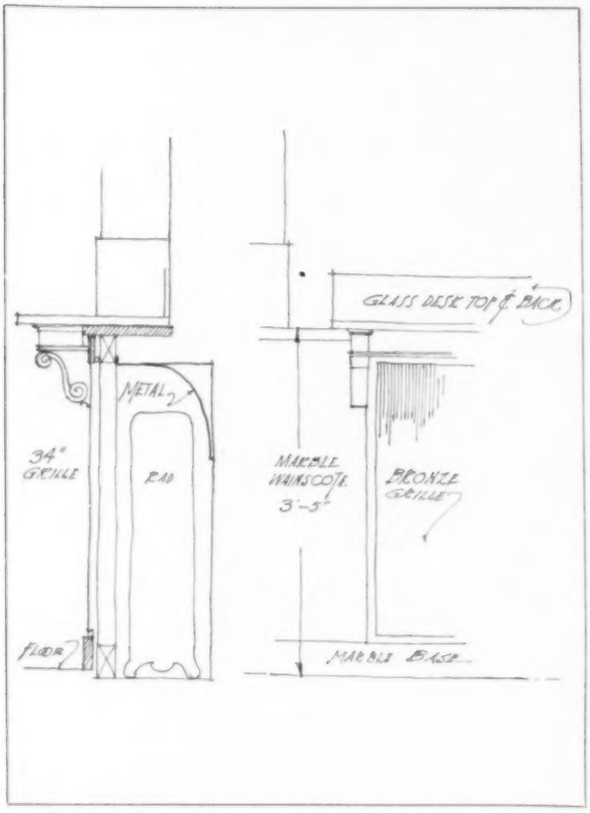
*Ventilation of Board and Committee Rooms.* This should be separate exhaust ventilation, affording about 15 to 20 air changes per hour. Where feasible the air supply may be taken from the main banking room, but otherwise there should be a supply from the outside. The air supply should be filtered and automatically tempered, and the apparatus should be separate from other systems. The apparatus should be under remote push-button control from the respective rooms.

*Kitchen and Dining Room Ventilation.* This should be by separate exhaust ventilation from the kitchen, with hoods over ranges, kettles, urns and bake ovens, affording about 20 air changes per hour. The dining rooms may be very successfully ventilated by exhausting into the kitchen, but an adequate automatically tempered and filtered air supply should be furnished for the dining rooms with side inlets near the ceiling or vertically through the window sills. Exhaust may also be taken from the dining room to supplement the exhaust through the kitchen, but ample flow should be maintained *from* the dining room *toward* the kitchen, in order to keep the kitchen odors from reaching the dining rooms and other parts of the building. The foul air from kitchen and dining rooms should be discharged above the roof and in such locations as not to be objectionable in adjacent quarters or where it might be drawn into fresh air intakes. The kitchen exhaust should be taken up separately in a heavy iron or masonry flue with automatic fire damper, automatic bypass around fans, and with steam jet fire-extinguishers, since vapors frequently collect and take fire in kitchen flues.

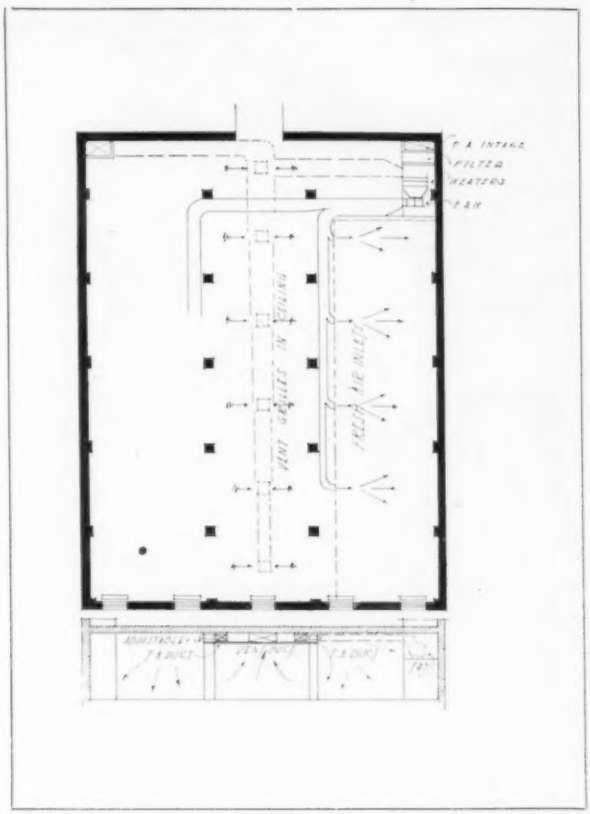



Half-Section Showing Downward System of Cooled and Humidified Air and Exhaust

*Ventilation of Machinery Spaces.* Boilers and engine rooms entirely below grade should be supplied with filtered and tempered fresh air, although it is not necessary to provide for as much heating of the air as is generally required for other spaces, since the heat from the apparatus and piping will usually suffice. From four to six air changes per hour are usually sufficient, except in cases of congested equipment where much heat is given off. Exhaust systems are required where such heat is to be removed or where odors from machinery might otherwise escape to the upper floors. Such exhaust should be by mechanical means unless dependable gravity methods may be provided through flues around the outside of the chimney or through other flues of sufficient height to overcome the vagaries of the wind and weather. Care must be exercised to see that the boiler draft is not interfered with, either by the removal of too much air from the boiler room and adjacent spaces or by the lack of fresh air supply by either natural or artificial means. The removal of air from the boiler room is likely to cause




Sketch of a Type of Concealed Radiator Under Check Desk



A Simple System of Ventilation for Office or Work Space

back drafts, and the carrying of flue gases out into the rooms. All foul air from machinery rooms should be carried to a point above the roof and discharged so as not to cause a nuisance to surrounding quarters or be drawn back into any fresh air intake. Air conditioning may be necessary in certain instances of shut-in, congested spaces, but special care must be taken to prevent drafts where this is employed.

*Generally.* Fresh air intakes should be from points two or three floors above grade or sufficiently high to prevent the intake of dust and dirt. If air is taken from the roof, intakes should be from points removed from chimneys, exhaust outlets, and other contaminating influences. Air filters should be of the metal constructed type and either automatically self-cleaning or provided with convenient equipment for cleaning and reconditioning. Main exhaust dampers should be provided with remote control for operation from convenient points, or with automatic control for closing when the systems are not in operation, and for opening when they are, so as to conserve heat and prevent back drafts. Each fresh air inlet or foul air outlet should be provided with a louver, damper or deflector, as required, so that each individual opening may be properly adjusted. Fresh air inlets should be provided with metal roll type or other convenient shutters for closing off when not in use, and both fresh air inlets and foul air outlets should be provided with wire mesh bird guards. All ventilators, hoods, bird guards and other metalwork above the roof should be of copper or other rust-resisting material. Stair and elevator enclosures, especially in tall buildings, should be provided with tight or revolving doors to overcome the chimney effects of these shafts on the air movements.

*Unit Ventilation.* Ventilating units may be employed to advantage in many departments, where more elaborate systems are not procurable, and they lend themselves very well to use in cages, working spaces, board rooms, etc. They have one particular advantage favorable to satisfactory results as far as the occupants of such spaces are concerned, and that is that they may be locally controlled to suit those within the immediate vicinity. They should be enclosed or built within recesses, with adequate provisions for fresh air supply from a clean source and be provided with individual or centralized filters. The foul air may be removed by the methods described for other types of supply systems.

Some recent developments in the use of concealed heaters with tempered air supply from a plenum fan system, so dampered that part of the air can be so supplied and part recirculated from the room, would indicate that these may also be used to advantage for the less elaborate systems. Adjustable dampers are used so that any portion of the air supply may be from the plenum system, and arrangements are also such that the air so supplied acts on an ejector principle to accentuate the recirculation from the room.

# WHAT THE BANKER EXPECTS OF HIS ARCHITECT

BY

C. STANLEY TAYLOR

A LARGE proportion of average individual business success may be attributed to the capacity for appreciating the other person's side of a business problem. Many of the troubles which are encountered in business relationships could be more readily smoothed out if the capacity for understanding the other man's point of view were more uniformly distributed among business and professional men. Nowhere is this fact more definitely obvious than it is in the architectural profession today. Disappointments on the part of clients in most cases originate in a lack of mutual understanding.

It is quite refreshing to take up a problem deliberately from the opposite point of view and to learn, from an analysis so made, some of the workings of the client's mind, and thus establish factors which will result in a more satisfactory conclusion of the business contact. In this article it is our purpose to discuss the architect's relationship with banker clients by endeavoring to analyze what the banker expects of the architect whom he has engaged to design a new structure or to alter and improve existing banking quarters. From such an analysis we may develop a basis upon which the architect may carry to completion a bank building project with the utmost satisfaction to both himself and his client.

When a banking organization plans to build, it is confronted with essentially the same problems that are present in any building operation of an investment nature. To these are added a few highly specialized problems centered around protective systems, vaults, and arrangement of space which will result in the most efficient conducting of the bank's business. In spite of the fact that bankers are often looked upon as the sources of money for building operations, they must give as careful consideration to their own expenditures as do firms in other lines of business. When a bank builds, the economic aspects of the investment must be analyzed from every point of view or the bank will be involved in an expenditure greater than its income warrants, or will be possessed of an inefficient structure. Even though bankers devote their attention exclusively to financial matters, they are not as a rule acquainted with the details of financing and other economics of building operations. They properly look to their architects for facts which will enable them to analyze the cost of their new building, the maintenance cost, and in some instances the income which may be derived through the rental of the space not used by the bank itself. This aspect of the situation is sometimes overlooked by architects who fail to appreciate the fact that bankers devoting themselves to corporate securities and governmental matters rather than to mortgages and loans on real estate, may be just as much in need of guidance in the development of their own projects as a home-builder or the head of an organization without building experience.

The first problem the banker must solve is the determination of the type of building in which to house his institution. He may elect to build a structure solely for banking purposes, in which case he desires a more or less monumental building of no great size, all of the space of which is to be devoted to the requirements of his own business. The other type of bank structure provides banking quarters in combination with rentable space in the form of either stores or offices. The latter type is designed to produce a certain amount of income which may be applied toward reducing or eliminating the carrying charges accompanying the investment in land and building. Bankers are still struggling with the problem of choosing between these two types of structures. They seek buildings which will express their strength, integrity and responsibility, and the wealth of their organizations. They have been accustomed for many years to the creation of monumental buildings of architectural beauty and great dignity. Possibly each has taken a certain amount of personal pride in having a building which is superior to those of his competitors. On the other hand, bankers have found the burden of these buildings to be very real. Their maintenance cost has constituted a drain upon the banks' resources and profits, and the gradual depreciation of the value of the structures has been another element of cost which they have frequently been unable to justify as attributable to the advertising value of the buildings.

Banks in large cities, such as New York, Chicago, Philadelphia and elsewhere, have had forced upon them the necessity for combining income-producing space with their banking quarters, in order to offset the very excessive rent cost in the congested areas where their bank buildings must be located. They have frequently accepted this requirement and have created buildings of greater size in which the banking quarters take a relatively small percentage of the space. Since smaller banks look to these larger organizations for precedents, not only in their banking operations but in their methods of doing business and housing their organizations, there has come to be a fairly general acceptance in smaller communities of the idea of combining banks with income-producing space. Probably the trend will continue in this direction, for, after all, no intelligent banker can on the one hand advise his customers against extravagant expenditures for business buildings and industrial plants and on the other hand erect "banking monuments" which do not pay for themselves. An illustration of this occurred recently in Philadelphia, where one of the well established banks purchased a site and informed the

architect that a 10-story bank and office building was desired. The architect, apparently having more than the usual business acumen, immediately inquired as to the reason for a 10-story building. The bankers' rather surprised response was that the added space was to reduce the cost of carrying their building. The architect took it upon himself to make a careful analysis of the cost of the property and of the proposed structure, including the usual operating costs and the gross income to be expected from the office space to be thrown on the market. He found that a 10-story building would almost carry the investment, but would leave no margin for its amortization. A little further study showed that a 14-story building would not only take care of all carrying charges on the investment, including depreciation, but would amortize the cost of the building in 20 years and give the bank its quarters free of all expense. Upon reporting these findings to his banker clients, they adopted his suggestions and displayed a great deal of confidence in the architect's judgment on all the other business matters which developed during the course of the operation.

After the type of building has been established, the space requirements for conducting the bank's business must be established through a careful study of the actual working methods of the bank. The banker conceives of this problem in two ways. He probably has a fairly fixed idea as to the size of the public space and a fair knowledge of the amount of working space necessary to take care of his employes and the bank's working space and equipment. The banker does not always analyze this problem in terms of cost, but he very soon finds that this aspect requires attention. He expects his architect to work these general ideas as to the size and layout of his public and working spaces into a structure which will fall within a cost figure which has been at least roughly determined upon. Bankers have accepted the necessity for combining their quarters with income-producing space with much grace. They have nevertheless retained a strong and well founded desire for creating an imposing display of strength, wealth and high position both within their quarters and throughout the buildings they own.

It is undoubtedly necessary that banking quarters create an atmosphere of permanence and dignity through consistent architectural character. The use of the finest materials and the soundest methods of construction is imperative. Nothing can be more disastrous than evidence of false economy through structural cheapness or the failure of building materials or finish. The architect is expected to utilize his designing talents to create a masterpiece of architecture and at the same time to exercise his business acumen and ingenuity to the end that the bank may be well housed at reasonable cost. In both these basic requirements, the banker looks to his architect for a knowledge of protective systems, vaults, bank equipment, and the organization of the bank's work to the end that the space may be so arranged as to reduce to a minimum the time and labor required in the daily work. Much depends upon the architect's cleverness in planning a layout to afford the greatest security to cashiers, tellers and clerks during banking hours and to form an invisible but impregnable line of defense against intrusion after the bank is closed. Perhaps the most important phase of this problem is the designing of vaults. The banker is beginning to appreciate that securing economical vault construction is an important problem and that it is one in which the architect can play an important part. The Federal Reserve Board, prior to the development of Federal Reserve Bank buildings in some 20 cities throughout the country, appropriated $120,000 for special research into the construction of vault walls and linings. This work was carried out under the direction of Alexander B. Trowbridge, who was consulting architect for the Federal Reserve Board, and resulted in the construction of experimental vault walls of many types, which were subsequently penetrated under time tests. As a result of this research, many millions of dollars were saved in the erection of the Federal Reserve Bank buildings throughout the United States.

One matter which the banker usually places wholly in the architect's hands is the provision of adequate space to take care of the business which is anticipated. Large banks have many thousands of accounts and have widely adopted the system of classifying the accounts alphabetically or numerically, with a teller assigned to each division. This requires a multiplicity of tellers' cages and involves unusual liberality in the public space to provide for the many customers who must be accommodated at once. Congestion in public space is exceedingly dangerous. There must be ample room at all times to afford the guards an opportunity for close supervision of all persons, even during the rush closing hours and during the times there is extra business which comes when payrolls are being prepared.

The banker has a right to expect that the architect, knowing approximately the amount of money available for his new building, shall proceed to draw up sketch plans which are not exaggerated and which come fairly within the given appropriation. It is utterly illogical to provide sketch plans which obviously cannot be built for the desired cost and which must result in the forming of unfavorable opinions on the part of bank directors when this fact is ultimately determined, and it is always far better to face facts in the beginning. The banker expects to give his architect the data for the functional plan. No one knows his individual business as well as he; no one can forecast its growth as well. His architect may wisely call the banker's attention to the value of elasticity in plan, to the anticipation of growth, to modern planning ideas which have been successful elsewhere, but he must at the same time appreciate the effects of local conditions and methods of doing business. What is good for a bank in one city or town may not of necessity apply in another instance.

# SPECIFICATIONS FOR BANK BUILDINGS

BY

LEWIS W. FOSTER

OF THOMAS M. JAMES COMPANY, ARCHITECTS

SPECIFICATIONS for bank buildings have the same fundamental principles as those for any other type of structures. The better these principles are known, the better specifications will be written. The specifications determine the success of a building project to a greater extent than any other document, and they affect every person interested in the project. The responsibilities of the specification writer are, therefore, many and varied. They may become a source of pleasure and satisfaction to the man who writes them, or they may be decidedly irksome. Incidentally, they may be the direct cause of the failure of a project, or of the architect. The responsibilities of the writers of specifications for bank buildings are as great as those placed upon the writers of specifications for other types of buildings. The kinds of materials and the quality of materials and workmanship vary greatly; probably the quality is higher in bank buildings than in other commercial structures. Any one type of building naturally has its particular features which are not common to other types. This possibly applies in a greater degree to bank structures than to most other types of buildings, since few others require as much special equipment,—such as the bank counter screen, the security vaults, the various protective devices, and particular kinds of furniture and equipment. The hospital, of course, requires the most exacting and varied equipment and detailing.

The specifications for a bank building (and this applies to other particular types of buildings in varying degrees) offer an excellent opportunity for standardization. By this we mean the use of standard sections of the specifications, standard paragraphs or standard sentences, descriptive of some particular material, method, or class of workmanship. The use of standard subdivisions of the general specification will save the architect considerable time, but they should be used with the greatest of care. This will be considered in greater detail in later paragraphs of this article. The success of any building project is probably due more to the proper spirit of coöperation between those interested than to any other one thing. The writer of specifications must ever bear this in mind, and should at all times take particular care to foster this feeling throughout his specification and to demand that it be the guiding factor in the actual construction work; otherwise the proper coördination of the work of the various trades will not result. Without this spirit of coöperation no building project can be considered a complete success.

We must assume that the writer of specifications for bank buildings is experienced and qualified. All will have their own theories and systems as their aid in completing a proper specification and for use as a reminder and check upon their work. There are certain fundamentals which go to make up a good specification for a bank building. Some of the more important principles, if emphasized here, will serve to call them again to mind. Without a complete knowledge of the basic principles, the specification writer is very likely to lose sight of them in constructing his specification as a whole. It is well to avoid repetition in a specification as far as possible, although a certain amount will be necessary, especially if the specification be divided into sections, as the work is divided into trades. Repetition in a specification is required under these conditions in order that the estimators will overlook nothing and in order that the workmen at the building will overlook no important features where the activities of various trades come together. The specification writer must realize the weaknesses that exist in the building industry as a whole. He must realize the rush which always develops during the estimating periods and must prepare his specification to overcome, as far as possible, the possibility of there being error due to complications and lack of clarity in the specifications. Clarity, then, is one of the most important qualities of good specification writing. Cut your cloth to fit the man. Exert yourself for clarity and simplicity. Specify exactly what you want. It is better not to say anything on a subject than to say too much and to say it indefinitely. Eliminate all unnecessary clauses. Say nothing that will suggest indecision in the slightest degree. Do not write anything that you know will not be enforced to the letter.

The reader may ask about the "or equal" clause. Many specification writers say, and try to make themselves believe, that the use of this clause is wrong. The great majority of writers, however, use it constantly. It is a good clause and proper, but be sure that the specifications define its meaning properly and clearly. Leave no doubt in the minds of any of the estimators as to what the meaning of the clause is and why it is used in the specification. It should mean that the architect is the sole judge of the "equality" of materials and that his approval is necessary in writing and his decision is final. The purpose of the "or equal" clause is to protect the owner from a "monopoly" price, or to allow an available material to be substituted at the architect's discretion for a material that could not be delivered at the proper time. Building conditions and requirements are changing constantly. Everyone connected with the building industry is endeavoring at all times to bring down the so-called high cost of building. At the same time, they are trying to build

better. The specification writer is supposed to be fully acquainted with all phases of the building problems and with the rapid changes in the industry. The use of a properly defined "or equal" clause comes to the rescue of a specification writer when criticism is directed against him by the owner who hears of some new material or method and learns that his architect is not fully acquainted with it. The use of this "or equal" clause brings to the architect's attention for the first time many of these new materials and methods. It is sometimes advisable to allow the general contractor, in preparing his proposal, to give alternate proposals for materials or methods which he may consider the equal of those which have been specified. Coming in an alternate proposal, these new materials are presented and can be investigated and given proper consideration after the bids have been submitted and when there is more time to reach a decision as to their value. The use of this much discussed clause allows the writing of a specification with a broadness not readily attainable without it, and if properly defined, "or equal" can work no harm.

Specifications are written primarily as an accurate guide in building. They are practically the only records of what is required in the nature of materials, methods and workmanship, and they are, therefore, of the greatest importance. To be sure, the estimators, the contractors and the workmen may seem to disregard the specifications to an unreasonable degree. This may be due largely to the fact that they are in many cases entirely too complicated and involved. It is best to use simple words that any workman can understand and to make the sentences just as short as possible. Technical language should be used only in its well known trade meaning. Always give directions; never make suggestions. Do not try to conceal obligations. State clearly and specifically the results you want to have accomplished and the methods that must be used to obtain these results.

A financial institution is very likely to consider its building project with its commercial aspects uppermost in the minds of the building committee. The building is erected primarily to provide quarters for the bank. It must meet the requirements of the particular institution at a cost the committee decides it can afford. The bank must guard, at all times, the interests of its stockholders and of its depositors. Today "service" is very much stressed in banking circles. We find the banks providing service unheard of a few years ago. The bank building should be considered a form of service for the bank's depositors. The success of the bank is very closely related to the success of the building architecturally, as well as being dependent on the quality of service which it can provide for its customers. The success of any banking institution is very intimately connected with the success of the community as a whole. The specification writer must take these things into account in the preparation of his specification. He must be in close touch with all developments of the project from its inception to its completion. He must know intimately the vital requirements. He must see that the materials and equipment he specifies are the best to meet these requirements. He is responsible, in great measure, for the success or failure of the work, since a poor specification will seriously affect the bank, its service to its depositors, and its value to stockholders and community.

Standardization is of great assistance in specification writing, especially in bank work. Standards developed by constant use are undoubtedly of great value. The term "standardization" in architectural work is often frowned upon, as "too commercial." But, in writing specifications for bank buildings, we are writing specifications for institutions that *are* commercial. Standardization can be and has been used successfully. It is recognized by the American Institute of Architects and it has published certain standard documents that without question have been a great success and relieve the duties of the specification writer considerably. Various trades have successfully produced standard specification documents for their particular trades. These, too, have been of great assistance to the specification writer. Standardization in specification work should be considered simply as an aid to accuracy and clearness,—a method to assist the production of a good specification. Architects who use an old specification corrected and changed for a new piece of work are unthinkingly standardizing,—so why not standardize and take advantage of short cuts and the great saving of time made possible by this simple means?

Standardization must, however, be used with considerable care. It is a most harmful tool if used improperly. Unless carefully used, it leads to unnecessary repetition, and many times there is a possibility of contradiction. Standard sections of a specification, standard paragraphs and standard sentences may very readily be used to describe the various materials in any type of building and to describe the methods and quality of workmanship in any kind of a specification. They apply particularly well to the description of the materials and methods and workmanship for a bank building, and especially to the highly specialized features peculiar to a bank, such as counter screens, vaults, protective devices, equipment, etc. The cost of the completed structure must always be kept in mind in using various standards. It is probable that a series of standards may be evolved for such items as must be regulated by costs. In considering the vault requirements for a bank building, we realize that the cost of the vault may vary greatly. The prime measure of vault construction requirements is the rating established by the burglary insurance underwriters. They have fixed various classifications whereby the rate that the bank must pay for burglary insurance is determined. These rates vary greatly, depending upon the construction of the vault, its floors, walls and roof as well as the construction of the vault doors

and the equipment within the vault. It is also affected by the protective devices which may be installed. Like all measures of this type, they are based on minimum requirements. Institutions that keep only a few dollars and no securities in the vaults may not, when they consider the insurance rates, feel that it is worth while to meet even the minimum requirements. The larger institutions, on the other hand, which store collateral and securities and have safe deposit boxes for the use of their customers, will undoubtedly decide, because of the insurance rates, to more than meet the minimum requirements. Many banks, for one reason or another, may wish to exceed very greatly the minimum requirements. Many feel that such action is good advertising,—that they are providing the greatest degree of protection to their customers, thus improving the service.

It is possible, therefore, for the specification writer to have several different standards for vault construction, for vault doors and for vault equipment, and to use his judgment in regard to a particular project in the selection of the standard for vault work. In consultation with the bank's building committee it can be very readily determined upon before the specifications are written, in order that the institution will have the vault which will best suit its particular requirements. The use of standards will require constant checking because of constantly changing conditions and new technical developments. The subject of counter screen construction may be treated in a similar manner, and costs will naturally vary with the type of screen and the kind of material of which it is constructed. Perhaps the latest development in this field is the so-called "screenless" counter. Many bankers feel that this type does not offer their employes the proper amount of protection. The other extreme would be the so-called "bullet-proof" counter screen where "bullet-proof" materials, such as glass, wire and steel are used. There are various other types of counter screens which are probably more common than either of the two extremes mentioned here. These types vary considerably in cost, from the wood counter and counter screen, to that of marble or bronze in various combinations. The specification writer must have in mind the costs of the various types of counter screen. The architectural design affects the specifications for the counter screen to a much greater degree than the construction of the vaults. In considering the various protective devices, costs and insurance ratings must be thoroughly investigated before the specifications are written, since costs will mount in proportion to the protection required. There is the question of protecting the vault from attack from the outside during hours that the bank is open for business as well as during the hours that the bank is closed. There is the question of protecting the interior safe deposit boxes, storage vaults and security chests from attack at all times. There is also the possibility of a person's being locked in the vault, and this must be considered by the specification writer.

Standards or no standards, a bank building project cannot be completely successful without the proper spirit of coöperation between all parties to the project. This includes the owner, the architect and his employes, the contractor, the various sub-contractors, and the workmen. The specifications should be permeated with this spirit of coöperation without which coördination between the trades cannot be obtained. Without proper coördination delays result, costs climb, and unsatisfactory workmanship and materials develop in spite of the most careful and rigid inspection by the architect, and trouble develops in all its "57 varieties." With coöperation, the resulting success can be enjoyed alike by owner, architect, builder, workmen and the community in general. It can then be said that the poor old specification writer has fulfilled his responsibility. He has written another good specification for a bank building.

For the convenience of specification writers there is included here an outline list of many details which a specification should include.

GENERAL CONDITIONS. Use Standard General Conditions of the Contract as published by the American Institute of Architects.

ADDITIONAL GENERAL CONDITIONS. There are generally some items of General Conditions in addition to those included in the American Institute of Architect's General Conditions of the Contract, such as definitions of the sections or divisions of the specification, of the "or equal" clause, surveys, checking, photographs, progress work, schedules, etc.

ADDENDA. Various addenda which may be written from time to time during the estimating period or during the construction of the building may be added at this point in the specification.

MISCELLANEOUS GENERAL CONDITIONS. This section would include various items which are of a general nature,—items which must be done by the general contractor for the general benefit of all of the various sub-contractors and trades which may be employed on the building, such as cleaning the building, removal of rubbish, layout of the work, cutting, patching and repairs, any special plan which the contractor is required to provide, watchmen's service, etc.

TEMPORARY WORK. This section would cover such items as may be of a temporary nature, but which will be required for the use of the various trades, and covers such subjects as storage bins, sheds, batterboards, bracing and shoring, centering, electric work, elevators, building enclosures, fences, etc., protection of adjacent structures, pumping, stairways, water supply, etc.

WRECKING OF EXISTING BUILDING. Permits; Insurance; Bonds; Public utility service; Inventory; Materials.

EXCAVATION. Description of probable soil conditions resulting from test pits, borings, etc. Unit prices for additional excavations, rock, etc.

FILLING AND GRADING. Back fill; Rough grading; Top soil; Excess materials; Planting beds; Sodding; Seeding.

LAND DRAINAGE. Dry wells; Cisterns; Dry drains.

PUBLIC UTILITY SERVICES. Permits; Locations; Rules and Regulations; Sanitary drains; Rain drain; Water supply; Electricity; Gas; Telephones.

CONCRETE WORK. Materials; Aggregates; Cement.

*CONCRETE.* Mixtures; Reinforcing; Bars; Piers; Cages; Mesh; Forms.

*WORKMANSHIP.* Approval; Freezing weather; Mixing; Openings; Bond; Cutting; Joints; Placing; Protection; Repair; Tests.

*CONSTRUCTION.* Areas; Bases; Bulkheads; Curbs; Expansion joints; Fences; Fireproofing; Floors; Floor construction; Floor fill; Under floor; Wearing surface; Hardener; Foundations; Forms; Gutters; Lintels; Partitions; Pits; Piers; Retaining walls; Footings; Facing; Roof construction; Sidewalks; Stairs; Tanks; Trenches; Walls; Vaults; Materials; Methods; Mixture; Care; Coöperation; Floors; Insulation; Openings; Reinforcing; Waterproofing.

MASON WORK. Materials; Workmanship; Brickwork; Materials; Common brick; Paving brick Concrete brick; Enamel brick; Face brick; Fire brick; Hollow brick; Metal ties; Laying of common brick; Laying of face brick.

CUT STONE WORK. Materials; Granite; Limestone; Marble.

*WORKMANSHIP.* Carving; Cutting; Moulded work; Washes; Reveals and returns; Finish; Setting granite; Setting limestone; Setting marble; Cast stone; Hollow tile; Terra cotta.

WATERPROOFING AND DAMPPROOFING. Materials; Workmanship; Guarantee.

MARBLE, SLATE, TILE, TERRAZZO WORK. Materials; Samples; Marble; Slate; Tile; Terrazzo; Installation; Cleaning and polishing; Guarantee; Setting marble; Setting slate; Setting tile; Placing terrazzo.

STRUCTURAL STEEL. Use the Standard Specifications for Structural Steel as adopted by the American Institute of Steel Construction, in such degree of detail as may be required by the particular work.

MISCELLANEOUS IRONWORK. Materials; Workmanship; Measurements; Field work; Guarantee; Construction; Gratings; Coal bin chutes; Ladders; Trench covers; Pit covers; Railings; Cleanout doors; Curb angles; Grilles.

BRONZE WORK. Materials; Workmanship; Construction; Hardware; Glass frames; Grilles and wickets; Vault grilles; Radiator grilles; Entrance doorway; Windows.

SHEET METALWORK. Materials; Workmanship.

ROOFING. Inspection; Guarantee; Materials; Slate; Tar and gravel; Workmanship.

FURRING AND LATHING. Materials; Workmanship; Construction; Ceilings; Beams and cornices; Chases, air ducts, etc.; Corner beads.

PLASTERING. Materials; Workmanship; Ornamental plastering.

CARPENTRY. Rough carpentry; Screens; Bucks; Ridge boards; Blocks; Plates; Anchors; Cornice work; Portico; Roof boarding; Nailing strips; Planking; Balconies; Slides; Scuttles; Stairs.

EXTERIOR FINISH WORK. Doors and frames; Window frames and sash; Columns, etc.

INTERIOR WOOD FINISH. Veneers and veneered work; Solid stock; Models; Junction strips; Base; Chair rail; Stools; Wire moulding; Architraves; Doors and door frames; Stairs; Counter screen; Wood partitions; Dado work; Mantels; Telephone booth; Cornices; Panels, etc.

FLOORING. Materials; Linoleum; Rubber tile; (see also Marble, Slate, Tile, Terrazzo work); Workmanship; Finish; Cleaning.

PAINTING. Samples; Materials; Workmanship; Exterior work; Interior work; Bank painting; Plumbing apparatus; Heating apparatus; Electrical apparatus; Signs.

GLASS AND GLAZING. Samples; Measurements; Guarantee; Protection; Materials; Distribution; Setting.

PLUMBING. Materials; Workmanship; Fixtures; Sanitary drainage system; Rain drainage system; Vent system; Cold water supply system; Hot water supply system.

HEATING. Materials; Workmanship; Temporary heat; Boilers, etc.; Tools; Piping; Valves; Hot water heating system; Vapor heating system; Steam heating system; Covering; Automatic control.

VENTILATION. Ducts; Fans; Equipment; Installation, etc.

ELECTRICAL WORK. Materials; Conduit and fittings; Wires and cables; Service switches; Switchboard; Entrance service; Test and guarantee; Workmanship; Outlets; Lighting system; Power system; Telephone system; Low tension system; Electric protective system; Electric lighting fixtures.

VAULTS, VAULT DOORS, VAULT EQUIPMENT AND SECURITY BOXES, ETC., require detailed specifications of a highly specialized character developed by the vault engineer in collaboration with the architect.

# STRUCTURAL FRAMES OF BANKS

BY

H. G. BALCOM

CONSULTING ENGINEER

THE structural steel framing for bank buildings, which this article is intended to describe in a general way, offers as many or more varied problems of engineering than are found in almost any other class or type of building. In bank structures, as in the case of other buildings of a monumental type, the structural design is regulated by conditions which the architect has pre-determined,—that is, the general layout of the banking room, and the architectural effect of the exterior in many cases practically fix the conditions that the engineer, in laying out the framework, is bound to follow. The varied conditions of framing found in bank buildings are, of course, due to the varied types of bank buildings, from the small country bank, where only a banking room and bank working space are required, to the larger city banks, where generally the banking room is located in the lower floors of a tall building. The steel layout for the smaller type of bank buildings is illustrated in Types A and B, which the writer has taken the liberty of referring to as "country banks," as they are generally found in the smaller cities and outlying communities. In the main, such a bank requires only a large banking room, one basement and a working mezzanine floor, and these banks are, of course, of extremely simple structural design. The columns in the basement story that support the banking room floor are generally laid out in the most economical way possible, and the clear span roof beams or trusses are generally located in the same way,—if not fixed otherwise by some considerations of the architectural design.

In buildings of Types A and B, columns in the exterior walls are sometimes used, but where the masonry construction is sufficient to take the roof loads, the roof girders or trusses rest directly on the walls with the proper bearing plates. The roofs of many of the smaller banks of this type throughout the country are carried on simple types of trusses. The air space between the hung ceiling and the roof of such a building serves as an insulating space against the hot sun, which might otherwise make the banking room unbearable in the summer.

Type A illustrates the framing of a bank one story high, in which it was not necessary to provide a skylight, since adequate daylight was admitted from the windows across the front and along one side. The roof is supported by simple steel girders from which the segmental plaster ceiling is hung. The bank of this kind is framed in the simplest way.

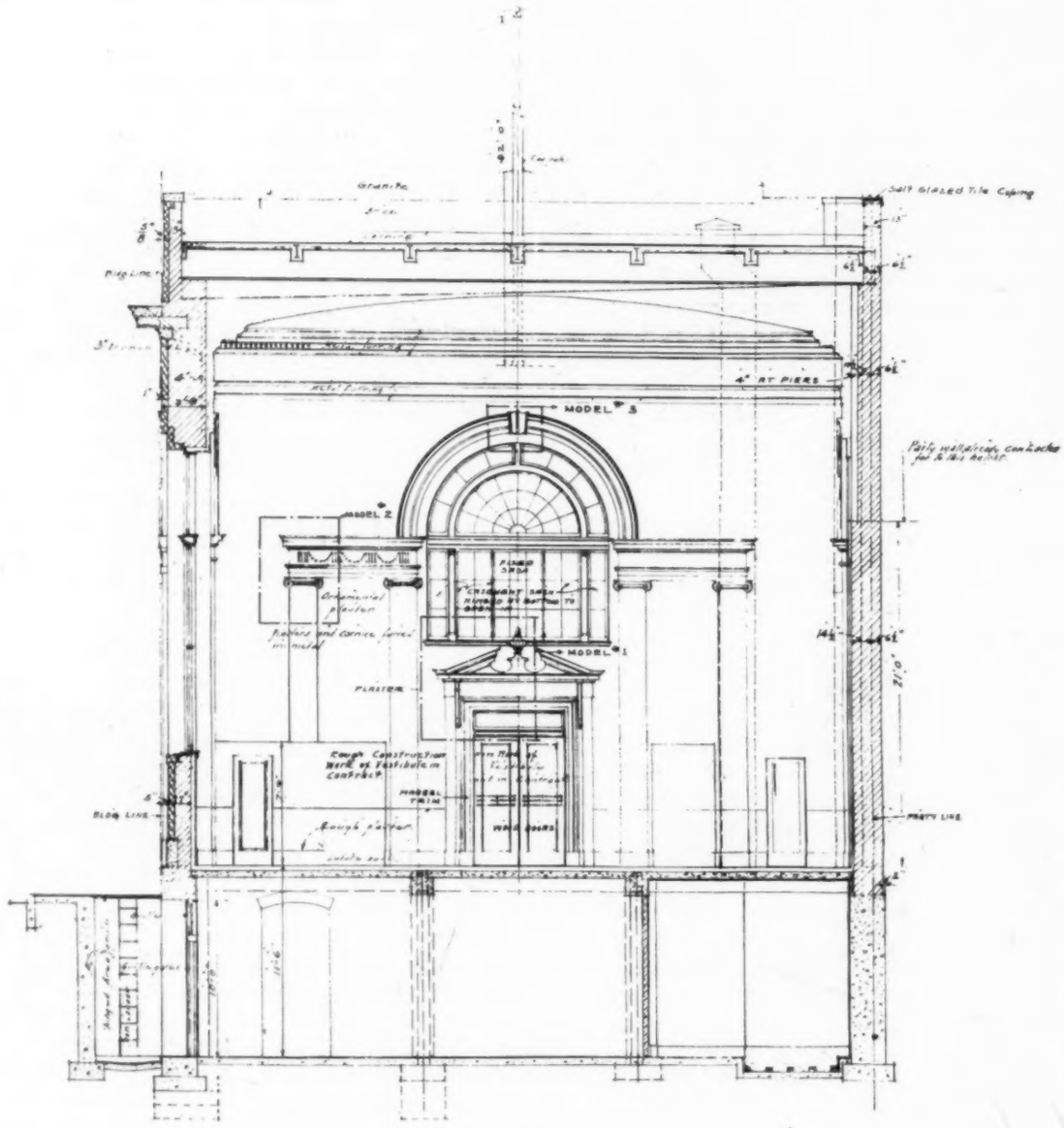
Type B illustrates a bank building similar to that of Type A, excepting that a skylight is used in the roof for light and ventilation where the building is located on an interior plot, and light and ventilation are not from the side windows as in Type A.

Type C illustrates the condition where the banking room is located in the lower stories of a tall building, and where it was possible to extend the columns of the office building through the banking room. While this is not often the case, the extending of the columns through the banking room naturally gives a more economical layout for steelwork than if building columns were carried on girders and trusses and the banking room free of columns.

A rather useful method of keeping a clear span banking room with a maximum of height and still supporting floors above, is illustrated in Type D. In this case the supporting steel girders are located in an upper story, and the floors above the banking room are supported on steel hangers. While this type of steel framing with suspended upper floors is more expensive than the usual type of framing, it does in many cases solve the architect's problem of getting area where it is most desirable and using the space for the steelwork in a less important part of the building. Both the fabrication and erection of steelwork on this type of framing are more costly than for ordinary steel-cage construction. A layout of this type may, without increasing the cost of the steelwork by any considerable amount, be extended to supporting two or three floors above the banking room, but if the structure is carried to a much greater height, cost of steelwork will be increased.

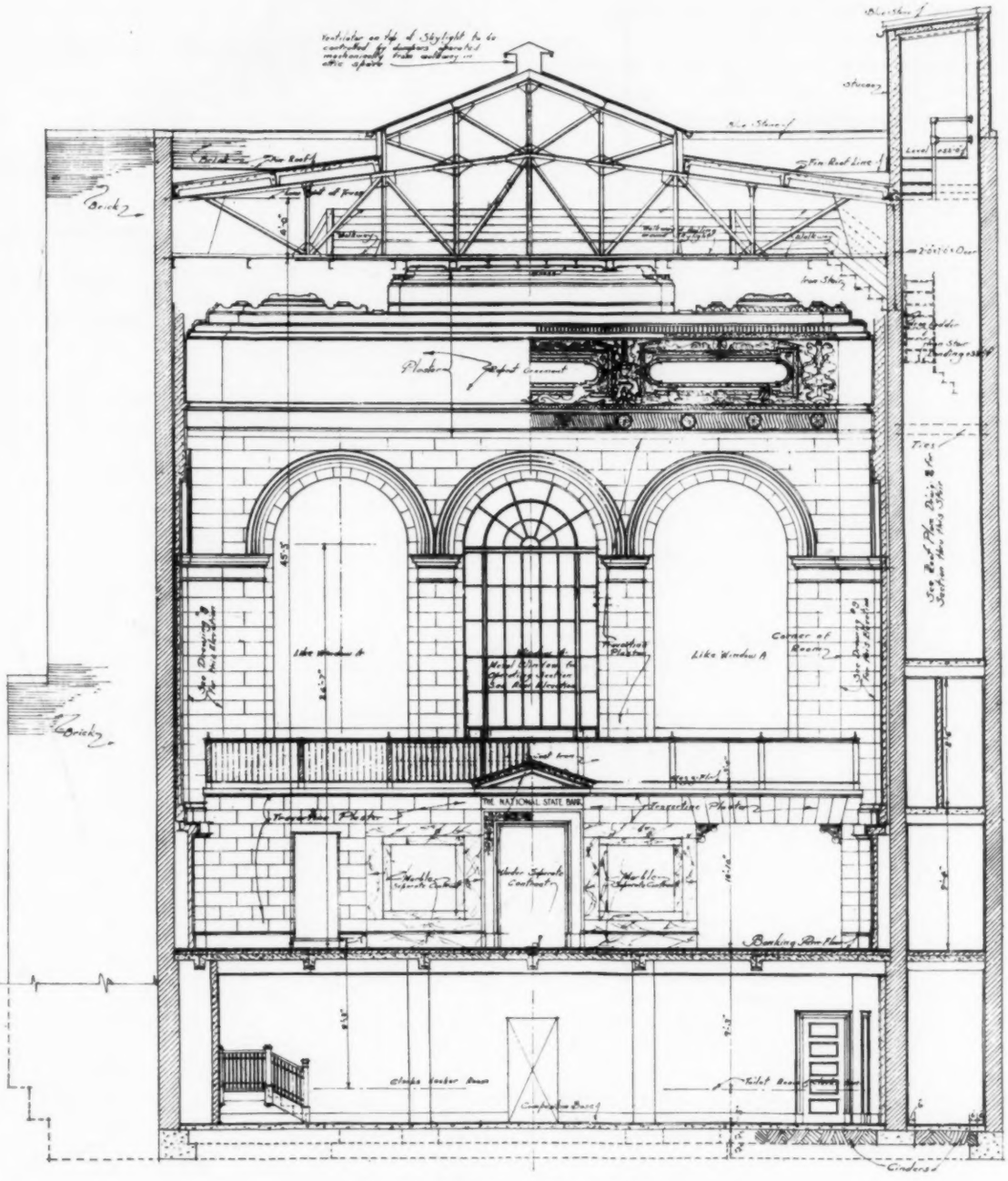
Type E illustrates about the maximum condition of heavy steel framing that is generally found in bank buildings. The two-story trusses shown in this illustration span a banking room approximately 80 feet wide, and in addition carry 14 or 16 office floors above. Trusses are generally used under these conditions, as they permit passageways between the members and make the space between the trusses available. Box girders were used to support the structure over the front and rear where the span was short enough to allow such construction. The large two-story trusses were used where the span was the maximum and many stories of office floors had to be supported. In the open court, one-story trusses were used, as there were no office floors to be supported. The flat roof of the court is placed at the lower chord of the truss and is provided with vault lights to admit light to the main banking room.

This article is written with the idea of indicating typical conditions only, since each individual building presents its own particular problems in the steel layout, just as it does in other particulars. One building, which the writer regrets that he was unable to illustrate, and which in his opinion was most interesting and unique, had an elliptically shaped banking room. This, of course, is an unusual form, and it involved many interesting features of steel construction. The typical problems are all that the writer has attempted to mention in this brief article.



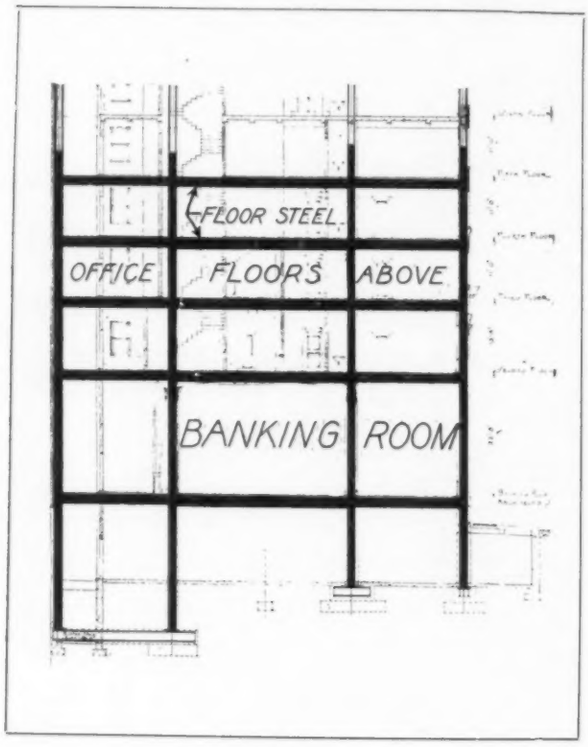

TRANSVERSE SECTION
LOOKING TOWARD FRONT

TYPE A

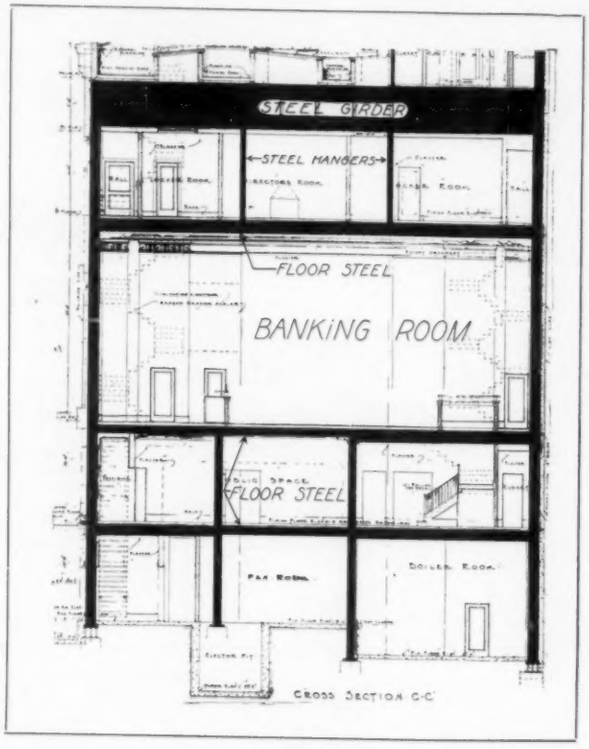



TRANSVERSE SECTION A-A

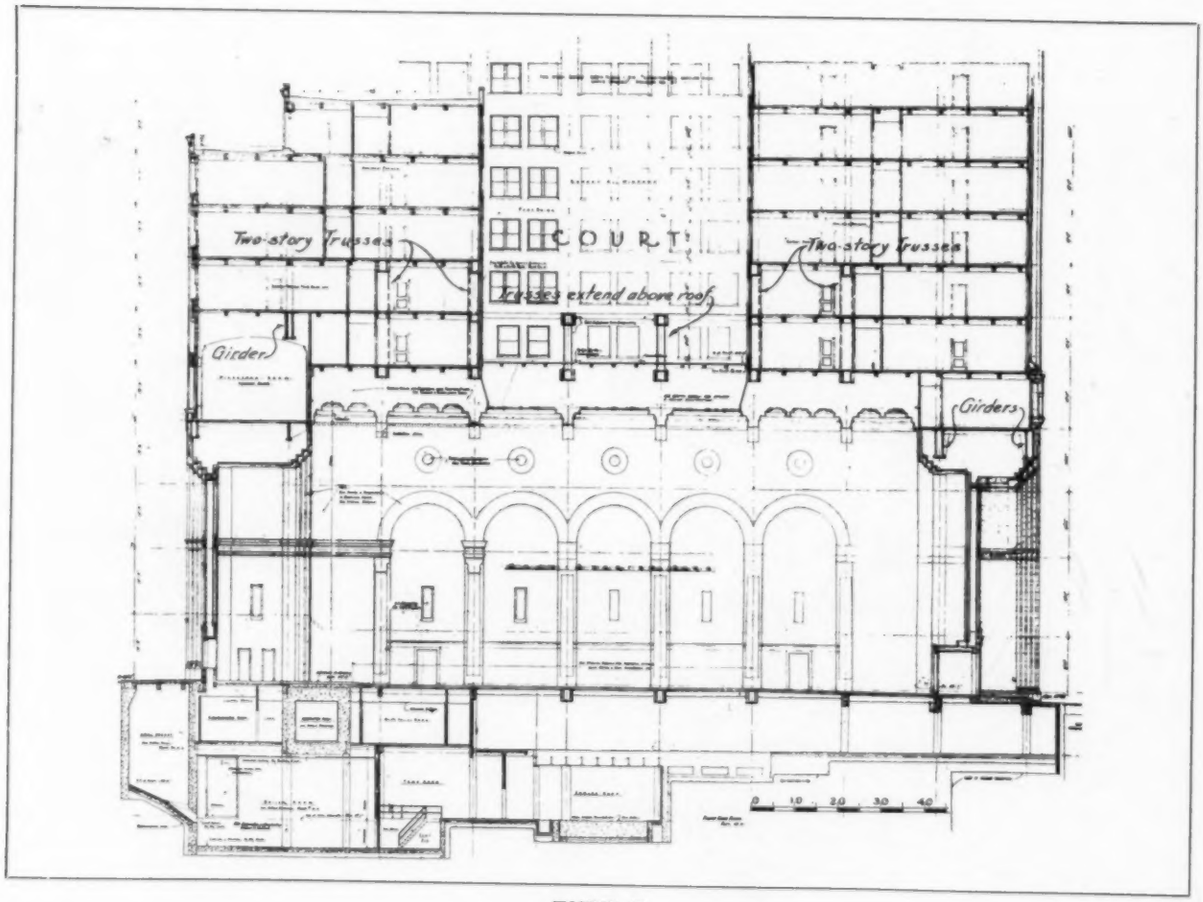
TYPE B




TYPE C




TYPE D




TYPE E

# SUPERVISION OF BANK BUILDING CONSTRUCTION

BY
GARDNER C. COUGHLEN
OF WEARY & ALFORD COMPANY

THAT the solidity and permanence of a banking institution may be expressed in a manner befitting its standing in the community, the construction of the building should embody in every detail the ultimate in the economical use of the materials chosen and in the labor of erection and installation. The drawings and specifications will prescribe the quality of materials and labor desired, but the superintendent of construction, resident on the site, is the man responsible for securing the quality of all labor and, in many instances, the quality of material furnished at the building.

Supervision of building construction requires a high degree of intelligence, based on experience in both office and field, and an executive ability similar to that required of any army field general. Certain general rules of conduct may therefore be laid down for the guidance of construction supervision. A series of instructions concerning the superintendence of any kind of building construction should be predicated on the theory that they are supplementary to the drawings and specifications. Such instructions should be considered the philosophy governing the entire construction program and should therefore stress the major "do's" and "don'ts" which experience and good practice seem to dictate as reasonable for all concerned in the erection of the building.

Building construction for a bank should be considered from an angle somewhat other than building construction for an individual. Banks are generally strongholds of conservatism and caution, and yet they are desirous of obtaining the best of quality products at the lowest prices possible with quality the ruling desideratum. The members of a bank's building committee are usually men who have had experience with other building construction operations, either as members of school boards or other building committees or through the bank's mortgage department. The construction superintendent therefore will find it necessary to consider the experience of his building committee, so that harmonious relations will govern the whole proceeding.

The superintendent should be in complete charge of all field operations and public relations. Whatever the superintendent may do will establish a reputation, either good or bad, for his employers as well as for himself, and he must therefore, be exceptionally careful to be correct, positive, conservative and considerate in all dealings with the persons with whom he may come in contact. The superintendent must always keep in mind the fact that the architect has furnished him, to the best of his ability, with drawings and specifications in such condition that from the time construction work starts he must supply the "know how" that the documents cannot furnish. No decision respecting anything whatever should be made without considering all facts bearing upon the question at issue, so as to arrive at the best decision the judgment of the superintendent makes possible. After making a decision known to others, it should not be changed unless there are given reasons for the change that are more logical than those on which the decision was based; a vacillating attitude destroys the superintendent's administrative control of the work.

In the construction of the building the owner has purchased something that must be delivered to him in accordance with all the contract documents. At the same time, each contractor has agreed to deliver a definite article to the owner and, therefore, the most serious duty the superintendent has to perform is to see that the spirit of every contract is executed in a manner equitable to both parties. The owner should not be expected to accept less than he has bought, and the contractor should not be expected to deliver more than he has sold. As every building contract requires a "give and take," equity between all parties concerned must be considered.

Directions to the superintendent should include those enumerated in these paragraphs.

A. As soon as possible, check all drawings and analyze the specifications, and either notify the head office of any discrepancies or list indefinite points for answer.

B. Check bench marks, property lines, and overhangs of adjoining buildings, and arrange for the establishment of one permanent bench mark reasonably close to the building, but not closer than 200 feet.

C. Examine all detail sheets and become familiar with their requirements.

D. Before establishing dimensions for constructing surrounding items that will be made from shop drawings, be sure that the shop drawings on file are the finally approved copies. Wherever any dimensions are in conflict with dimensions on the original scale drawings, follow those established by the shop drawings unless they appear to be illogical.

E. The superintendent must assume responsibility for the correctness of dimensions and for the worth of materials or workmanship furnished, so that the contract requirements are adhered to and the progress of the work made smooth for all concerned. Procrastination or lack of knowledge with respect to the necessity for rejection of faulty work and the consequent necessity for changes is condemned by the careful architect. Vigorous action with respect to such work should be taken immediately upon discovery. Faulty material should be discovered before it is incorporated in the building, and faulty work should be discovered promptly after it has been done.

F. As the person in control of construction, the

superintendent should endeavor to settle all questions himself, referring to the H.O. (home office) only such matters as should properly receive the attention of the H.O. before determination. Except in unusual cases, all questions that refer to matters shown on the drawings, mentioned in the specifications or covered by shop drawings or subsequent specific instructions from the H.O., should be answered by the superintendent. In all cases the superintendent should not forget that he is the man who is familiar with all conditions at the building, and in referring any matters to the H.O. for final determination he should be sure to explain all conditions that should be known by the H.O. before making the decision.

G. As soon as convenient, the superintendent should arrange a progress schedule, inform the various contractors of the dates tentatively fixed, and secure their reaction, after which he should prepare a final schedule and keep in constant touch with the contractors whose material must arrive within the ensuing four to six weeks. The superintendent should not depend on the H.O. to look after this detail, since whatever may be done by the H.O. on this item is supplementary to the superintendent's efforts.

Since the limitations placed on this article preclude a full discussion of all the construction work and the superintendent's responsibilities thereunder, only the matter of superintendence of several items of finish work in the banking rooms will be covered, it being assumed that the reader has some reasonably thorough familiarity with the general building construction supervision necessities.

### H. *Ornamental and Miscellaneous Iron*

1. Have material delivered according to a prearranged schedule, in proper sequence, and as soon as other work is ready to receive it. See that all items to be built into concrete or brick are on the site in time. 2. See that stonework is not damaged when installing window and door frames. 3. When framing of any kind is to be set in basement or other spaces that require waterproofing, see that all anchor bolts are waterproofed into the concrete before such framing is set. 4. Check location of stairs carefully where marble and plasterwork join with such stair construction. 5. See that calking around all door and window frames or other openings is done correctly. 6. Be very careful that floor checks are set level, at the correct floor heights and centers. 7. Make sure that steel sash operate properly, and check at frequent intervals to see that no plaster, dust or other substances have gathered in the sash and frame contacts to cause springing or bending of the sash when closing them during construction operations. 8. Have framing for all openings and for counter screen delivered and set in time for work of the contractor setting partitions and so that the electrician can get in his work, and that later the marble contractor may start setting marble for screens and columns. 9. Check laying out of all openings and screen center lines from the bench lines and marks originally established. 10. See that the screen framing is fastened with bolts to floor direct or to sleepers provided, and to columns and walls, being careful that the correct height is maintained and that framing is set in straight, plumb lines. 11. See that all finished work is well protected after erection, so it will not be damaged by workmen of other trades. 12. Check up to see if any finished doors or windows will have to be left out to allow vault doors to be moved in.

Make sure that:

13. Work is lined up and not allowed to sag in such places as in long, unsupported lengths of counter screen. 14. All field joints and miters are well fitted. In bronzework no filling materials are allowed. Shop joints are brazed and scarcely, if at all, perceptible. 15. Pilaster bases are evenly spaced at deal plates, and that joints between marble ledge and metal top screens, and between linoleum counter tops and top screen, are tight. 16. Joints where metal abuts wall or other surfaces are tight and neatly made. 17. Bronze doors are properly hung; that edges of doors line up with joints; that doors are not out of wind, and that floor clearance is proper. 18. Concealed screw fastening is used wherever possible; that all exposed screws are neatly fitted and that heads are not damaged.

When the erection is complete see that:

19. All screws are in place. 20. All movable parts operate properly, and that hardware is complete and in order. 21. All key work, and proper keying, have been carried out. All keys, properly tagged, are turned over to the superintendent who gives a receipt. These keys are given to the bank officials later, with keys for other work. 22. All work is well cleaned, scratches and abrasions removed, and finish left in its originally intended condition. 23. Exposed hardware and other items subject to handling are covered or otherwise protected. 24. All miscellaneous loose items, such as signs, officers' ledge sets, calendar cards, etc., are accounted for. 25. All small items likely to be stolen are stored in a safe place. 26. Proper bank officials are given thorough instructions as to the operation of any special equipment and methods of cleaning or otherwise keeping the work in first rate condition.

### J. *Marble*

1. Install steel framing for counterwork first of all, so that the electrician may start on his work, since no tile backing of screens can be done until all electrical work is completed. 2. Be sure that all steel framing is set from bench center lines and mark, set straight and plumb, and anchored thoroughly to walls, columns and floor. 3. Start work on walls and screen as soon as plaster and tile contractor is out of the way. 4. Check up to see that all piping and conduit work is in before laying floors. 5. See that finished floor levels and other heights are taken from original bench marks, previously established. 6.

Wire anchors of any material other than that specified must not be allowed. 7. When large size marble tile are used for floors, the fill should be laid across the space first to within 3/8 inch of underside of marble; then the tile should be wet and the setting mortar buttered over the entire surface, and tamped down to its right level. 8. Have all marble set for floors before the erection of radiator grilles or other ornamental work, so that proper fit of the latter may be made. 9. In spaces having marble base with cove and tile floors, have cove and base installed as soon as practicable, so that tile floor may be laid afterward. 10. Have all window stools and other horizontal or prejecting marble, such as counters or corners, covered where necessary, as soon as installed, to prevent damage.

Make sure that:

11. Mechanics are not allowed to use ledges for work benches or to store material on. 12. Stair treads are protected with boards securely held in place. 13. Fitting against other material is properly done, and cutouts for floor hinges, etc., are well jointed. At single-acting floor hinges, the base should be notched out at the bottom to clear the knuckle on the hinge arm and to permit the door to open without breaking the base. 14. Slabs are matched as to color tone and as to figure if any, bearing in mind the character of the material. 15. Electrical and other outlets are correctly placed. When outlets occur in the base, they should be centered if at all possible. Misplaced outlets detract from the appearance of any work. 16. Wet plaster is not permitted to fall on marble.

When floors are laid see that:

17. Packing boxes, etc., are *carried* and not *dragged* over the floors, as deep scratches are often made in this manner. 18. Mechanics do not leave tobacco stains on floors, since they cannot be removed from some kinds of marble. 19. Oil from pipe cutting or other sources, including putty, is kept off floors and walls.

When marble setting is finished see that:

20. Joints are well pointed and in a plane. 21. Joints in moulded and flat work, if not in a plane, are rubbed down and the original finish restored. 22. All floors are properly rubbed, and that scratches, etc. are removed from treads, thresholds and other surfaces not polished. 23. All surfaces are thoroughly cleaned and left in finished condition. 24. Adequate protection is provided on surfaces that may be splashed by water thrown from the grinding and polishing machines.

### K. *Metal Cage Equipment*

1. Cage equipment is sometimes of wood, in which case much of what is often written on cabinet work will apply. 2. Installation of metal cage equipment is generally started after adjoining work is fairly well completed.

During erection see that:

3. Work is well fitted, properly fastened together, and solidly anchored in place, with all screws and nuts drawn up tight. 4. Cage posts and other upright supports are shimmed to concrete floor and do not rest on linoleum. Cage post feet, after floor covering has been laid, are to be solidly fastened to floor and post. 5. Electrical work is installed along with equipment, including all special electrical devices. 6. Abutments of counters and marble ledges are at the exact levels to allow for linoleum tops; distance from front of marble ledge to rear of counter is kept so that deal plate will have proper projection at front; counters are perfectly level so deal plate will have uniform projection above linoleum top. 7. All hardware is neatly fitted. 8. All cove or other shoe moulding is in place. 9. After erection is complete, this branch of the work requires very thorough checking on account of its intricate detail and many miscellaneous items.

See that:

10. All work is cleaned up, including insides of drawers, cupboards, etc., scratches or other abrasions and exposed screw heads are touched up with enamel, and that finish in general is placed in its originally intended condition. 11. Linoleum tops are clean and that any joints between linoleum and other materials are tight and well made. Note that in general linoleum is to be laid without joints in itself. Air bubbles under linoleum are not permitted. 12. All equipment operates properly. 13. Hardware is as specified, operates properly, keying is correct, and all keys work; keys are tagged and turned over; stack locks or other locking devices are adjusted and work properly. 14. Drawers, etc. work easily and shut tight. This refers also to cupboard doors, etc. 15. All drawer interiors are complete and as called for. Filing devices, shelves, loose trays, inksets, bulletin boards, stop-payment panels and other miscellaneous items are complete and accounted for. Drawers that are interchangeable are in the locations indicated. 16. Bank officials are properly instructed in care and upkeep of the work and in operation of any mechanical features.

### L. *Vault Work*

This work is generally completed some time before opening, and mechanics are sent later to do the final cleaning. On completion it should be gone over and checked. It is well to suggest here that extreme accuracy be used, in setting the doors, as to levels and position so that architraves will connect properly with adjoining surfaces and doors will balance properly.

In checking, these items should have careful attention. See that:

1. Vault doors are properly balanced. A door that is balanced can be given a slight push when in any open position and it will come to rest in a short distance and remain there. If a door is not balanced, it will move of its own accord from several different open positions, provided, of course, that the hinges are not binding. 2. Time lock and combinations

function. The time lock should be tried out for several days to make sure it is all right. Bank officials should lock and unlock doors at this time so as to become familiar with them. 3. All keys for glass doors, time locks, safe deposit boxes, etc., are on hand and work their respective locks. Every safe deposit box key should be tried. All keys should be turned over to the proper bank official by the vault foreman and be receipted for. 4. Burglar alarm is entirely connected with vault equipment and in working order. Bank officials should be made thoroughly familiar with the care and operation of the protection system by the foreman. 5. Fans. light fixtures or other work of an electrical nature installed under the vault contract is complete and working. 6. Bond boxes are as specified, and that special sheet metal equipment for large boxes is as called for. Sometimes special sheet metal equipment is furnished and installed by others, in which case see that after this equipment is installed, locker doors, etc., close properly.

7. Painting is well done and as specified. This includes the interiors of lockers, safe deposit nests, bond boxes, exposed lining, etc. 8. All work is properly fitted, with especial reference to exposed finish joints. 9. All natural finished surfaces are in good and clean condition, free from abrasions, rust, etc., and they are given a heavy coat of protective grease, if not of stainless steel, before the foreman leaves. 10. All miscellaneous items, such as hinges, hardware, gates, grilles, footbridges, etc., are in place, and are as called for. 11. Proper bank officials are given thorough instruction by the vault foreman in care, upkeep and operation of all equipment. 12. Vault work generally comes from the factory coated with grease as a rust preventative. After this is removed, a heavy coat of grease or oil is applied until final cleaning. Once cleaned and in use, all polished surfaces should be cleaned weekly by means of a soft cloth and light oil. This leaves a clean surface coated with a thin film of oil, and if regularly and properly done, will keep the work in good condition at all times.

13. After the foreman leaves, and until the men return for the final cleaning, polished steel surfaces are regularly inspected for rust spots. Should rust spots develop, immediately coat them with grease, a supply of which should be left by vault foreman for this purpose. 14. Never allow an inexperienced man to try to remove rust from polished steel. This work is for an expert. 15. Under no conditions use salamanders near polished steel, whether they are coated with grease or not. The acid fumes given off in combustion will cause rust to appear in a few hours. After 24 hours this rust will be almost impossible to remove without ruining the work. 16. Keep mechanics and others not familiar with the equipment, especially doors, from fooling with it. Much damage, hard to repair, can be done by mechanics of other trades who are fascinated by mechanism and often want to "see how it works."

### M. *Ceramic Tile and Terrazzo*

1. Make sure that all piping, conduit work and marble cove base is in before laying any tile floors. 2. Have brass mat frames set at time of laying marble floors. 3. See that a uniform joint is kept in floors and borders, and that it is laid to straight line. 4. Do not allow any blistered tile to remain in the floor; colors of tile must be uniform unless character of tile allows variation. 5. Floors must be level, and border on similar lines, straight and parallel. Easing off to square up rooms should be done in dark or otherwise obscure places. 6. If floor of some other material adjoins tile floor, see that the edge of tile is stopped against a perfectly straight board. Should there be a partition or screen covering such a joint, arrange to have the joint in center of the partition. 7. All joints must be grouted full, and afterwards the entire floor must be well cleaned. 8. See that no cement is left on floor after cleaning, as this will leave spots that are extremely hard to remove. 9. When setting tile wainscot, check the finished wall lines from the bench center lines, and the height of the wainscot above the finished floor from bench marks previously established. 10. The finished terrazzo floor must be well rubbed to produce an evenly polished surface.

### N. *Miscellaneous Equipment*

1. Check carefully all schedules and requisitions covering miscellaneous equipment not included in other contracts. See that shipment of such material is made in time, and after checking, store in a safe place any items that are not fastened in place. 2. If fire extinguishers are ordered, have them put in work spaces, etc., where they are easily seen and accessible. 3. Toilet accessories fastened in place should be located so as to look well and at the same time be convenient. 4. Other miscellaneous items generally used are included in this list: Cuspidors and mats, inkwells, blotter pads and inksets, waste baskets, electric fans, rubber mats and the like. 5. Initial supplies of such items as toilet paper, paper towels, liquid soap, etc., are generally ordered, in which case see that they are turned over to the person who will have charge of them. 6. Electric lamps are not included in fixture contracts. As soon as it can be done, a schedule of proper sizes of lamps for different fixtures should be made up. If the bank has not already a lamp contract, it should make one with its dealer. Order an extra supply of each kind of lamp. Lamping up is usually done by the electrician who hangs the fixtures. See that all lamps light and that switching is correct. Turn extra lamps over to the bank. 7. Vault keys should be turned over to the bank direct by the vault foreman. All other keys are turned over to the superintendent. A few days before the opening, these keys should be turned over to the individual who is to have them in custody. See that all keys are uniformly tagged and hung in key cabinet in a systematic manner.